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Science-Based Content Design and Technical Communication

Using scientific evidence to make content-related decisions empowers the technical communicator to create content that is truly user-centric.

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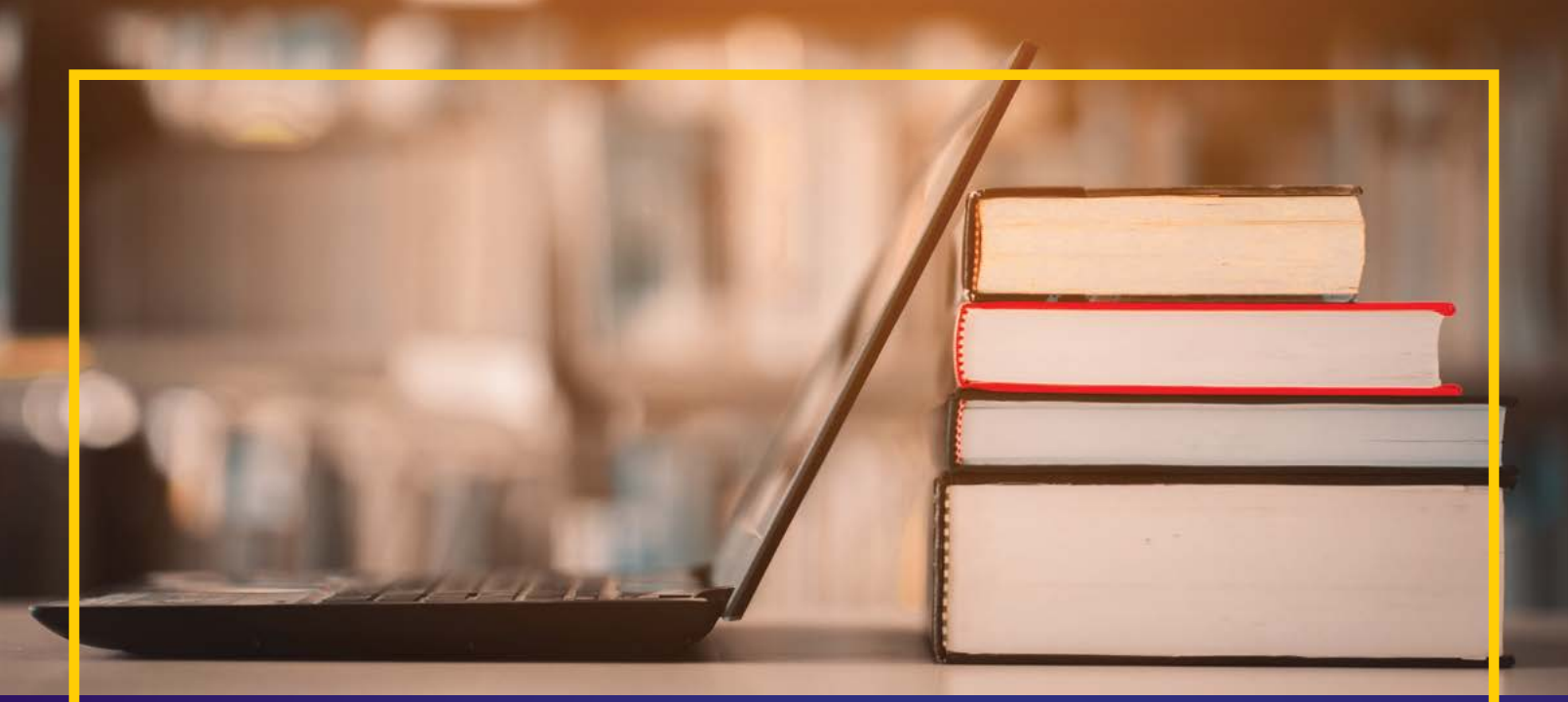

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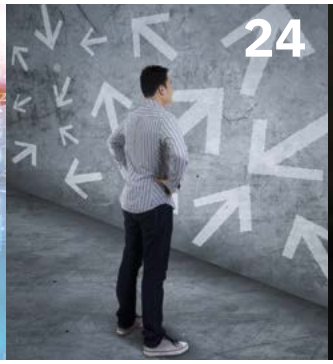

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A Note from the Editor

Have you ever skimmed a page in search of information, only to discover that it was hiding in plain view? Does your eye catch on a word or phrase that causes you to reread the whole paragraph again? I do. Frequently. Even when I'm not trying. But I can't always articulate what the problem is. During the planning process for this issue, I learned that content design is likely the "something" that catches my eye.

Content design is all about presenting information in the best possible way to meet our audience's needs. When done well, content design allows our information to be clear, findable, accessible, and helpful. Done poorly, it increases our mental workload and decreases comprehension.

In this issue, guest edited by Tina Kister and Scott Abel, you'll learn about how our choices in content presentation can influence our understanding of the words. For me, it's a fascinating insight into how brains work, and how we can make our content more accessible and easier to understand.

I look forward to hearing your feedback on this topic. Feel free to reach out to me at **intercom-editor@stc.org**. ■

Alisa Bonsignore
(she/her)

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Guest Editorial

Science-Based Content Design: How Humans Process Information

BY SCOTT ABEL | STC Fellow

In this issue of *Intercom*, I partner with information development ace Tina M. Kister to make the business case for using science-based content design in technical communication. Evidence-based content design decisions produce information *all* humans can process faster, with less effort, and with fewer frustrating, time-consuming, confidence-damaging, trust-busting errors.

Making practical, evidence-based decisions about content requires us to cultivate a deep understanding of how our eyes, brains, and minds work because of how we are physically and chemically structured. The contributors to this special issue are an interdisciplinary bunch — recognized experts in their chosen fields — who desire to help us take an evidence-based approach that aligns with how human beings naturally perceive and process information.

We present a sampling of lessons from across disciplines to demonstrate how taking an integrated, human-centered, and science-based approach can provide us with clear, actionable insight into creating content that genuinely helps people succeed.

In This Issue

We include contributors with expertise in a range of areas, including:

- Information developer, entrepreneur, and evidence-based content design evangelist Tina M. Kister, who tells us about her journey developing an online program for teaching a science-based approach to content design.
- Prolific writer and professor of computer science Jeff Johnson, who talks about the science of reading and how it should shape our decisions when developing content.
- Lecturer, researcher, author, and statistics guru Riccardo Mazza, who gives us tips for visualizing complex information to make it easier for others to understand and use.
- Researchers Yulia Goldenberg and Noam Tractinsky, who explore usability and human-computer interaction and discuss the importance of using an evidence-based approach when localizing user interfaces for readers of bidirectional languages, such as Arabic and Hebrew.
- University of Michigan graduate research assistant and cognitive psychology buff Xin Sun, who debunks myths that negatively influence how we create content, focusing on the popular myth of learning styles.

A First Step

There's no way to convey everything there is to know about science-based content design in the space we have available here. Consider the lessons in this issue the first step toward a better understanding of how taking an integrated, human-centered, and evidence-based approach to content design decisions can provide us with clear, actionable insight into creating content that helps people succeed.

Use the knowledge our contributors share here as a jumping-off point to continue learning how science can help us make sound business decisions about how we design and deliver content to those who need it. To continue learning about science-based content design, follow the contributors on social media. Explore their blogs, books, presentations, and other content. These experts have many important lessons to share that we can put to work to make our content as helpful as possible. ■

For more information about science-based content design, join Kister's InfoDev Academy, opening later in 2021. Register to receive an invitation to join the academy's free online learning community at www.infodevacademy.com.

Science-Based Content Design

Developing an Online Program for Success

By Tina M. Kister

Everyone who creates content engages in design, either incidentally or intentionally. Incidental design leads to information that is ambiguous, difficult to process, and unappealing. Science-based content design provides you with practical, evidence-based guidelines for making design decisions that naturally facilitate information processing.

I first started formulating the idea of an online program for teaching science-based content design while managing technical proposals for a telehealth company. Our proposals were good, but, with millions of dollars at stake, I wanted them to be *great*.

As a writer and editor, I would sometimes come across bits of text that just didn't seem right. I knew from experience how important it was to only make essential changes that added clarity and value. So, before making any changes, I would take a "scientific" approach and use my initial reaction as a starting point for observation and investigation.

I would conduct research and refer to style guides to determine if the text contained an actual error, or if some aspect of it was simply unfamiliar to me. (Humans have a natural affinity for the familiar, and a natural aversion to the unfamiliar, which is not a sound basis for editorial decisions.)[1]

As I worked on our proposals, I noticed myself having the same sort of response to non-text elements — e.g., noticing that something wasn't quite right, but not really knowing what it was or how to explain it. Searching for answers in the world of traditional design was seldom productive, because I could only find vague advice like "use *transparent* headings," or "use *logical* colors."

Because of my background in visual design, I could usually fix a design problem pretty quickly, when I was given the latitude. Often, however, convincing my bosses and colleagues to accept and adopt the changes was another matter entirely. So, just as I had done with the text elements, I started investigating my responses to the non-text elements.

And a whole world opened up to me. A world in which content design — the way you arrange elements on a page or a screen — had order, logic, and reason behind it. I learned about the anatomy of the eye, the neurochemistry of the brain, and the predictable but still unexplained phenomena of the mind. I learned about attention, both voluntary and involuntary. I learned how humans are natural "infovores," with an innate desire for information. And I learned how high-quality content design rewards and encourages our natural

information-seeking behavior.[2]

I also discovered a rich world in which others are pioneering the use of science in design, particularly for complex, verifiable information — people like Jeff Johnson, Riccardo Mazza, and Noam Tractinsky, all of whom have contributed to this special issue.

As I explored the science of design, a pattern emerged — a pattern in which design decisions either undermined and distracted users from the ideas conveyed by the content, or reinforced and supported the ideas. And I realized that the ability to make well-reasoned design decisions has little to do with talent, subjective aesthetics, or art. Instead, it's a process that can be taught and learned, and content people who focus on text and language (e.g., writers and editors) make these same types of decisions every day.

I also learned that, for information developers — those of us who compile, create, or curate any verifiable intelligence into usable form — design isn't about making things "pretty" or "beautiful," but

about making things *usable*. And, it just so happens that what is usable *is* beautiful![3,4]

So, using the traditional framework for teaching visual design, in which the "basic design elements" are combined with the "basic design principles" to create guidelines, I developed a science-based approach specifically tailored for complex, technical, instructional, and other high-value content. It expands the traditional approach to give you more practical tools for making design decisions and evidence-based guidelines

Science- based content design isn't about making things beautiful — it's about making things *usable*. It just so happens that what is usable *is* beautiful!

based on the anatomy of the eye, the neurochemistry of the brain, and the phenomena of the mind.

So, What *is* It?

Science-based content design is both a paradigm and a methodology for creating content that aligns with how human beings naturally perceive and process information. It allows us to extend the skills we use as writers and editors to create information deliverables that *work*, so that the information we create is easy to find, read, understand, use, and remember. To understand science-based content design, it's critical to clearly and precisely define the terms "content" and "design," as both words are highly ambiguous and mean different things to different people.

Content

The term "content" simply refers to the real-world *thing* that you create and share, whether digitally or physically. In this sense, content does not refer to ideas or meaning — it refers to the actual information *product* that results from information development.

Content consists of three main components:

- Ideas
- Language
- Design

This definition is valuable because it allows us to focus on what is verifiably perceivable to users, and to tackle each component separately. We can make sure the ideas are sound, the language is apt, and the design reinforces both. (I don't know how many times I've had subject-matter experts, or SMEs, re-explain ideas to me — ideas I already fully understand — when what I needed was for them to make sure the ideas were clear in the *content*, not in *me*.)

Design

The term "design," as a noun, simply refers to the arrangement of things. As a verb, it refers to the act of arranging things. In the context of science-based content design, "design" refers to the act of arranging content elements on a page or a screen, as well as choosing the attributes for each of the elements. The process of design is essentially a process of making decisions and then testing and refining those decisions. In this sense, design has nothing to do with art, creativity, or self-expression, except as a tool — a tool used in nearly all disciplines, whether legal, scientific, educational, industrial, architectural, or political.

Intentional Design

It's important to note that everyone who creates content engages in design, although often as an *incidental*, rather than an *intentional,* act. "Intentional design" refers to conscious design meant to achieve a specific, desired outcome. When design is incidental or careless, it leads to information that is ambiguous, difficult to process, and unappealing.

Content vs. Design

Many people continue to argue over whether content or design is more important, and which should come first in the information-development process. From an information-processing perspective, the idea that content and design exist separately and are somehow opposed to one another is nonsense (Figure 1). Human beings process *all* content as a collection of visual stimuli that needs to be decoded. Content and design are inseparable, which means that, to be an

effective technical communication professional, you must learn to use design intentionally.

In summary, science-based content design teaches you that design consists of a series of decisions and provides you with the skills and knowledge to make evidence-based, content-related design decisions that naturally facilitate information processing. This, in turn, allows your users to spend their time, effort, and cognitive resources on successfully using information to accomplish things in the real world, rather than decoding and interpreting content. In facilitating the success of your users, you also facilitate the success of your organization and yourself.

Interdisciplinary and Inclusive

One of the most wonderful things about science-based content design is that it is *truly* user-centric. It reflects how human beings — *all* human beings, regardless of age, economic status, education, or other demographics — perceive and process information. Science-based content design is interdisciplinary at its roots, crossing traditional boundaries to combine knowledge from fields such as vision research and ophthalmology, neuroscience, cognition and attention studies, psychophysics and psychology, and even fields such as artificial intelligence and environmental sustainability.

Science-based content design helps us cultivate a deep understanding of how human sensation and perception work, and to turn that understanding into concrete, practical guidelines for developing information — guidelines that take advantage of the way our attention is directed and disrupted; the way we scan documents before reading them; the way we make associations based on our past experiences; the way we process both text and non-text as visual stimuli — and so much more.

Example: Complementary Colors

A few years ago, while working as a business process engineer, I was helping my boss prepare a report. He wanted to use the company's official colors for the report cover, so he chose green for the background and red for the title. While his general instinct was aligned with "good" (i.e, effective) design, the execution was problematic (Figure 2).

Most people instinctively know that there's something wrong with this design and may even understand that the problem is rooted in the use of complementary colors (red and green).

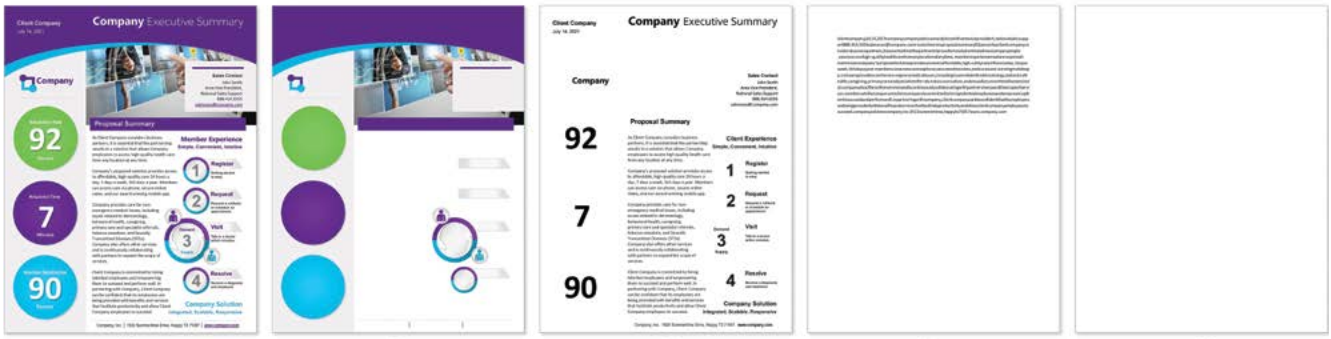

Figure 1. Panel A shows a final content deliverable ready for use. If you remove all of the "content," or text elements (Panel B), you are left with a collection of meaningless shapes and colors. On the other hand, if you remove the "design," or non-text elements (Panel C), you are left with a deliverable that is disorganized and unusable. But even this deliverable clearly includes elements of design, with variations in font, shape, white space, and position. If you remove those remaining design elements (Panel D) then you are left with an incomprehensible block of text. And yet, this presentation still includes elements presented in a *specific* font, in a *specific* color, in a *specific* position on the page. If you remove *all* design elements, you are left with nothing but a blank page (Panel E).

(Complementary colors are color pairs opposite one another on the color wheel, as shown in Figure 3.) Few people, however, understand exactly *why* using complementary colors presents a problem.

The answer is rooted in our basic physiology. It turns out there are specialized cells involved in color perception, called "opponent" cells, that respond to visual stimuli in a *differential* way. When activated, they both *excite* and *inhibit* the neurochemical signals that tell our brains how to interpret what we see. So, when we perceive a color (such as red), these opponent cells tell our brains to *not* perceive that color's complement (in this case, green).[5,6]

When you combine this differential response with the fact that our eyes are automatically and involuntarily drawn to certain features, including edges,[7] we have a perfect storm of visual stimuli. In essence, we are simply *unable* to perceive the edge where green and red meet. This phenomenon is the basis for many optical illusions (Figure 4).

This is one example of how poor content-design decisions can impede our ability to both perceive and comprehend information. This, in turn, prevents us from experiencing the pleasure of successfully acquiring information (Figure 5).[2,8]

Conclusion

Just as science-based content design is inherently interdisciplinary in its roots, it's also interdisciplinary in its application. You can use it to create effective content across all fields, genres, and media. You can use it regardless of whether your content is related to software or health care, is presented in a scientific style or a journalistic style, or if it appears in a slide show or a user manual.

In this "Age of Information," nearly everyone relies on high-quality content design in daily life, whether planning a weekend getaway or responding to a worldwide pandemic. And yet, too often, information developers are not recognized, valued, and rewarded for the sophisticated skills we cultivate, the spirit of service in which we work, or the critical role we play. With science-based content design, we can *show* people, rather than just *tell* people about, the true value of the important work we do. ■

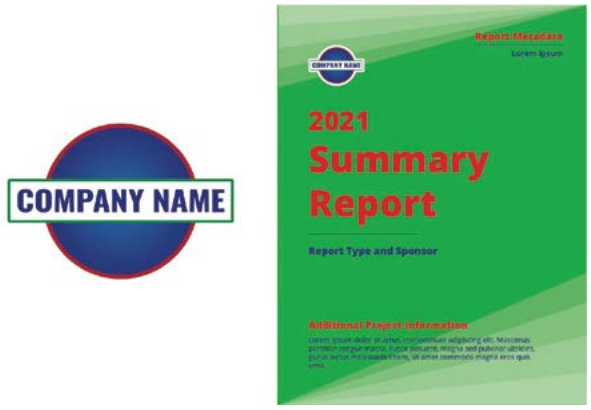

Figure 2. While the color scheme for this report cover reflects good (high-quality, or effective) design because of its consistency with the company's brand identity, the use of red text on a green background (adjacent complementary colors) is an example of bad (low-quality, or ineffective) design. Science-based design explains why.

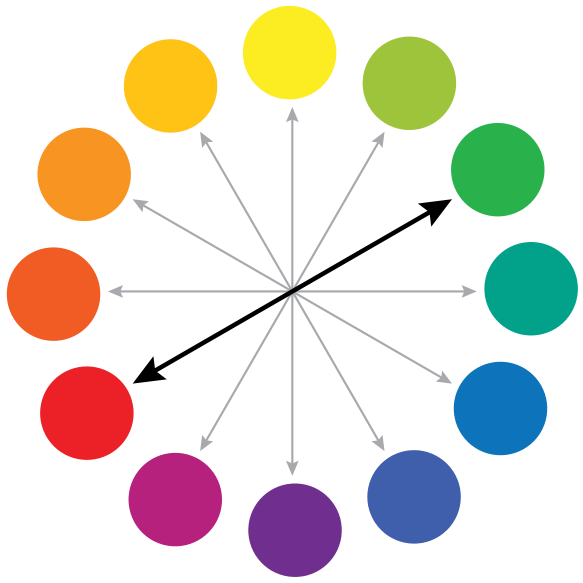

Figure 3. Complementary colors are color pairs opposite one another on the color wheel. They are also paired in terms of our physiology — specialized "opponent" cells in the retina, when stimulated, simultaneously *excite* the neurochemical response that causes us to perceive one color (such as red) and *inhibit* the neurochemical response that causes us to perceive a color's complement (green).[4,5]

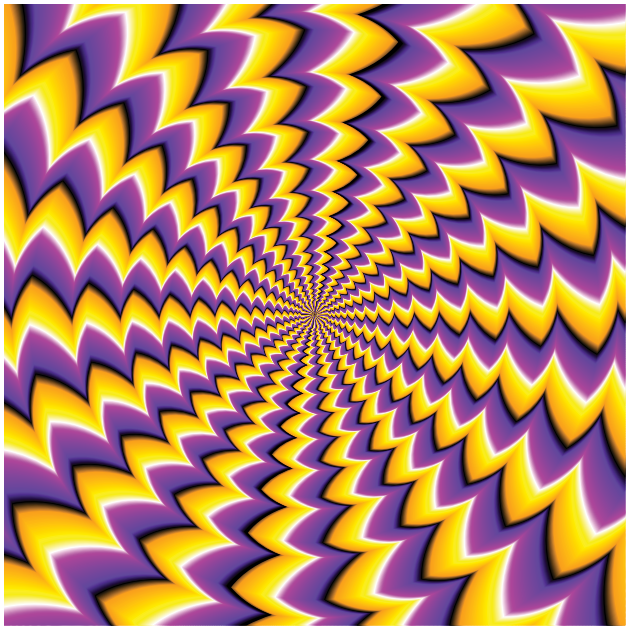

Figure 4. Our inability to perceive the edges where complementary colors meet is the basis for many optical illusions (Image credit: Shutterstock).

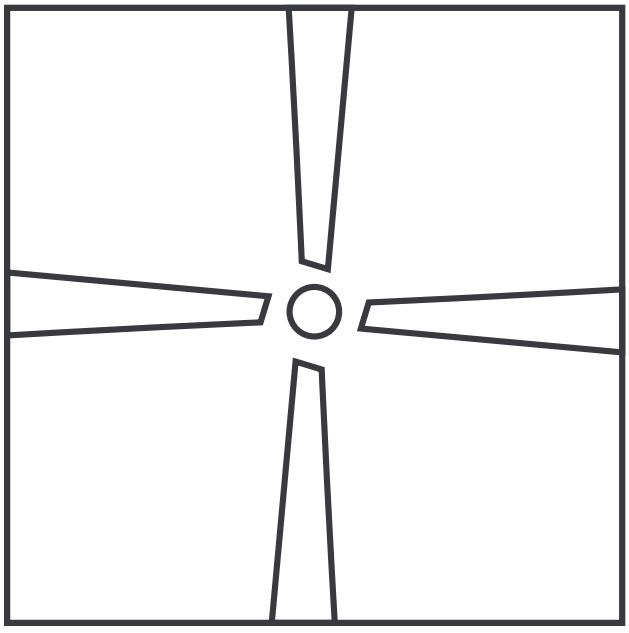

Figure 5. This type of image, which is called a "droodle," has been used in studies exploring the relationship between comprehension and pleasure. Such studies have found that, when we read a caption that gives a simple image meaning, we experience measurable pleasure.[1] (The caption for this image, based on an image created by artist Roger Prie, is *Four elephants sniffing an orange.)*

TINA M. KISTER (tmkister @infodevacademy.com) is the founder of the InfoDev Academy and specializes in taking an interdisciplinary approach to improving information-development processes. She has been called a "thought leader" and "change agent" in technical communication. With a background in both creative and technical communications, as well as certifications in technical communication (CPTC), project management (PMP), proposal management (APMP), and content strategy, Kister provides a rare perspective that synthesizes best practices across traditionally siloed areas of business communications.

References

1. Harmon-Jones, Eddie, and John J. B. Allen. 2001. "The Role of Affect in the Mere Exposure Effect: Evidence from Psychophysiological and Individual Differences Approaches." *Personality and Social Psychology Bulletin* 27 (7): 889–98. *https://doi.org/10.1177/0146167201277011.*
2. Biederman, Irving, and Edward A. Vessel. 2006. "Perceptual Pleasure and the Brain: A Novel Theory Explains Why the Brain Craves Information and Seeks It Through the Senses." *American Scientist* 94: 247–53. *http://www.jstor.org/stable/27858773.*
3. Tractinsky, Noam, Adi S. Katz, and Dror Ikar. 2000. "What Is Beautiful Is Usable." *Interacting with Computers* 13: 127–45. *https://doi.org/10.1016/S0953-5438(00)00031-X.*
4. Tuch, Alexandre, Sandra P. Roth, Kasper Hornbæk, Klaus Opwis, and Javier A. Bargas-Avila. 2012. "Is Beautiful Really Usable? Toward Understanding the Relation Between Usability, Aesthetics, and Affect in HCI." *Computers in Human Behavior* 28: 1596–1607. *https://doi.org/10.1016/j.chb.2012.03.024.*
5. Goldstein, E. Bruce, and James Brockmole. 2016. *Sensation and Perception*, 10th Edition. 10th ed. Cengage Learning.
6. Pauli, Ruth. 2010. "Opponent Processes in Colour Vision: What Can Afterimages Teach Us." University of Birmingham. *https://e-space.mmu.ac.uk/576747/1/Pauli%20(Ruth)%202010%20(Birmingham.pdf.*
7. Wolfe, Jeremy M., and Todd S. Horowitz. 2004. "What Attributes Guide the Deployment of Visual Attention and How Do They Do It?" *Nature Reviews Neuroscience* 5 (6): 495–501. *https://doi.org/10.1038/nrn1411.*
8. Johnson, Jeff. 2014. *Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Guidelines*. 2nd ed. Waltham: Elsevier.

Reading is Unnatural

Designing with the Mind in Mind

By Jeff Johnson

Reading is a complex, taxing process, particularly for unskilled readers. While speaking and understanding spoken language is a natural human ability, reading is not. Technical communicators can increase reading speed and comprehension with careful, science-based design.

This article is an abridged excerpt from the book *Designing with the Mind in Mind: Simple Guide to Understanding User Interface Guidelines*, Third Edition. Some explanations and examples have been removed due to space constraints.

Most people in industrialized nations grow up in households and school districts that promote education and reading. They learn to read as young children and become good readers by adolescence. As adults, most of our activities during a normal day involve reading. Reading is, for most educated adults, automatic, leaving our conscious minds free to ponder the meaning and implications of what we are reading. Because of this background, it is common for good readers to consider reading a "natural" human activity, like speaking.

We Are Wired for Language but Not for Reading

Speaking and understanding spoken language is a natural human ability, but reading is not. Over hundreds of thousands — perhaps millions — of years, the human brain evolved the neural structures necessary to support spoken language. Humans are born with an innate ability to learn, with no systematic training, whatever language they are exposed to. After early childhood, this ability decreases significantly. For example, newborn babies can hear and distinguish all the sounds of all languages, but as they learn the language of their home environment, they lose the ability to distinguish sounds that are not distinguished in that language.[1] By adolescence, learning a new language is the same as learning any other skill — it requires instruction and practice, and the learning and processing are handled by different brain areas from those that handled it in early childhood.[2]

In contrast, writing and reading did not exist until a few thousand years BCE and did not become commonplace until only four or five

centuries ago — long after the human brain had evolved into its modern state. At no time during childhood do our brains show any special innate ability to learn to read. Instead, reading is an artificial skill that we learn by systematic instruction and practice, like playing a violin, juggling, or reading music.[2]

Many People Never Learn to Read Well, or at All

Because people are not innately "wired" to learn to read, children who either lack caregivers who read to them or receive inadequate reading instruction in school may never learn to read. There are a great many such people, especially in the developing world. By comparison, very few people never learn a spoken language. Some people who do learn to read never become good at it.

A person's ability to read is specific to a language and script (a system of writing). To see what text looks like to someone who cannot read, look at a paragraph printed in a language and script that you do not know (Figure 1).

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Figure 1. To see how it feels to be illiterate, look at text printed in a foreign script: Amharic (top) and Tibetan (bottom).

Alternatively, you can approximate the feeling of illiteracy by taking a page written in a familiar script and language and turning it upside down. Turn this magazine upside down and try reading the next few paragraphs. This exercise only approximates the feeling of illiteracy. You will discover that the inverted text appears foreign and illegible at first, but after a minute you will be able to read it, albeit slowly and laboriously.

Learning to Read Equals Training Our Visual System

Learning to read involves training our visual system to recognize patterns exhibited by text.

> **While humans are born with an innate ability to learn whatever language they are exposed to, at no time during childhood do our brains show any special innate ability to learn to read.**

These patterns run the gamut from low-level to high-level:

- Lines, contours, and shapes are basic visual features that our brain recognizes innately. We don't have to learn to recognize them.
- Basic features combine to form patterns that we learn to identify as characters — letters, numeric digits, and other standard symbols. In ideographic scripts, such as Chinese, symbols represent entire words or concepts.
- In alphabetic scripts, patterns of characters form "morphemes," which we learn to recognize as packets of meaning — for example, "farm," "tax," "-ed," and "-ing" are morphemes in English.
- Morphemes combine to form patterns that we recognize as words — for example, "farm," "tax," "-ed," and "-ing" can be combined to form the words "farm," "farmed," "farming," "tax," "taxed," and "taxing."
- Words combine to form patterns that we learn to recognize as phrases, idiomatic expressions, and sentences.
- Sentences combine to form paragraphs.

How We Read

Assuming our visual system and brain have successfully been trained, reading becomes semiautomatic or fully automatic — both eye movement and processing.

As we read, our eyes constantly jump around, several times a second. Each of these movements, called "saccades," lasts about 0.1 second. Saccades are ballistic, like firing a shell from a cannon. Their endpoint is determined when they are triggered, and once triggered, they always

execute to completion. The destinations of saccadic eye movements are programmed by the brain from a combination of our goals, events in the visual periphery, and events detected and localized by other perceptual senses and past history, such as training.

When we read, we may feel that our eyes scan smoothly across the lines of text, but that feeling is incorrect. In reality, our eyes continue with saccades during reading, but the movements generally follow the line of text. They fix our "fovea" — a small area in the retina that allows us to see high-resolution detail in the center of our visual field — on a word, pause there for a fraction of a second to allow basic patterns to be captured and transmitted to the brain for further analysis, then jump to the next important word.[3] Eye fixations while reading always land on words, usually near the center and not on word boundaries (Figure 2). Very common small connector and function words like "a," "and," "the," "or," "is," and "but" are usually skipped over, their presence either detected in perifoveal vision — within the small area immediately surrounding the fovea — or simply assumed. Most of the saccades during reading are in the text's normal reading direction, but a few, about 1 percent, jump backwards to previous words. At the end of each line of text, our eyes jump to where our brain guesses the next line begins.

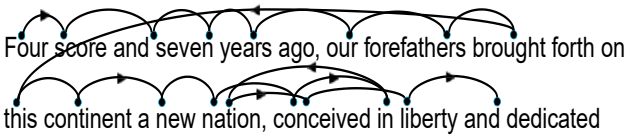
Four score and seven years ago, our forefathers brought forth on
this continent a new nation, conceived in liberty and dedicated

Figure 2. Saccadic eye movements during reading jump between important words.

How much can we take in during each eye fixation during reading? For reading European-language scripts at normal reading distances and text font sizes, the fovea clearly sees 3–4 characters on either side of the fixation point. The perifovea sees about 15-20 characters outside the fixation point, but not very clearly (Figure 3).

This is why centered text is difficult to read — it disrupts the brain's guess about where the next line starts.

Due to how our visual system has been trained to read, perception around the fixation point is asymmetrical; it is more sensitive to characters in the reading direction than in the other direction. For European-language scripts, this is toward the right.

Figure 3. Visibility of words in a line of text, with fovea fixed on the word "years."

Is Reading Feature-Driven or Context-Driven?

Reading involves recognizing features and patterns. Pattern recognition, and therefore reading, can be either a bottom-up, feature-driven process, or a top-down, context-driven process.

In feature-driven reading, the visual system starts by identifying simple features — line segments in a certain orientation or curves of a certain radius — on a page or display and then combines them into more complex features, such as angles, multiple curves, shapes, and patterns. Then the brain recognizes certain shapes as characters or symbols representing letters, numbers, or for ideographic scripts, words. In alphabetic scripts, groups of letters are perceived as morphemes and words. In all types of scripts, sequences of words are parsed into phrases, sentences, and paragraphs that have meaning.

Feature-driven reading is sometimes referred to as "bottom-up" or "context-free." The brain's ability to recognize basic features — lines, edges, angles, etc. — is built in and therefore automatic from birth. In contrast, recognition of morphemes, words, and phrases has to be learned. It starts out as a nonautomatic, conscious process requiring conscious analysis of letters, morphemes, and words, but with enough practice it becomes automatic.[2]

Context-driven, or top-down, reading operates in parallel with feature-driven reading but works the opposite way, from whole sentences or the gist of a paragraph down to the words and characters. The visual system starts by recognizing high-level patterns like words, phrases, and sentences or by knowing the text's meaning in

advance. It then uses that knowledge to figure out, or guess, what the lower-level components of the high-level pattern must be.[4] Context-driven reading is less likely to become fully automatic, because most phrase-level and sentence-level patterns and contexts don't occur frequently enough to allow their recognition to become burned into neural firing patterns. But there are exceptions, such as idiomatic expressions.

To experience context-driven reading, glance quickly at Figure 4, then immediately direct your eyes back here and finish reading this paragraph. What did the text say?

Now look at the same sentence again more carefully. Do you read it the same way now? Also, based on what we have already read and our knowledge of the world, our brains can sometimes predict text — or its meaning — that the fovea has not yet read, allowing us to skip reading it. For example, if at the end of a page we read "It was a dark and stormy," we would expect the first word on the next page to be "night." We would be surprised if it was some other word like "cow."

The rain in Spain falls manly in the the plain

Figure 4. Context-driven (top-down) recognition of the expression can inhibit seeing the actual text. In this case, readers are likely to perceive the word "mainly," rather than "manly," because of the context.

It has been known for decades that reading involves both feature-driven (bottom-up) and context-driven (top-down) processing. In addition to being able to figure out the meaning of a sentence by analyzing the letters and words in it, people can determine the words of a sentence by knowing the sentence's meaning or the letters in a word by knowing what word it is (Figure 5). The question is: Is skilled reading primarily bottom-up or top-down, or is neither mode dominant?

Feature-Driven, Bottom-Up Reading Dominates; Context Assists

Reading consists mainly of context-free, bottom-up, feature-driven processes. In skilled readers, these processes are well-learned to the point of being automatic. Context-driven reading today is considered mainly a backup method that, although it operates in parallel with feature-based reading, is only relevant when feature-driven reading is difficult or insufficiently automatic.

Mray had a ltilte lmab, its feclee was withe as sown. And ervey wehre taht Mray wnet, the lmab was srue to go.

Twinkle, twinkle little star, how I wonder what you are

Figure 5. Context-driven (top-down) reading: most readers, especially those who know the songs from which these text passages are taken, can read them even though the words have all but their first and last letters scrambled (top) or are mostly obscured (bottom).

Skilled readers may resort to context-based reading when feature-based reading is disrupted by poor presentation of information. In less-skilled readers, feature-based reading is not automatic; it is conscious and laborious. Therefore, more of their reading is context-based. Their involuntary use of context-based reading and nonautomatic, feature-based reading consumes short-term cognitive capacity, leaving little for comprehension. They have to focus on deciphering the stream of words, leaving no capacity for constructing the meaning of sentences and paragraphs. That is why poor readers can read a passage aloud but afterward have no idea what they just read.

Skilled and Unskilled Reading Use Different Areas of the Brain

Researchers have discovered that the neural pathways involved in reading differ for novice versus skilled readers. Of course, the first area to respond during reading is the occipital (or visual) cortex at the back of the brain. That is the same regardless of a person's reading skill. After that, the pathways diverge.[2]

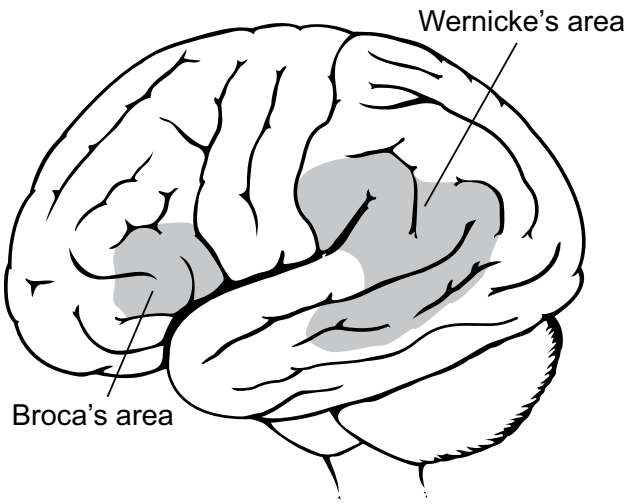

Figure 6. The human brain, showing Broca's and Wernicke's areas. In novice readers, an area of the brain just above and behind Wernicke's area becomes active. This area then communicates with Broca's area and the frontal lobe.

Novice

In novice readers, after the visual cortex is activated, an area of the brain just above and behind Wernicke's area becomes active (Figure 6). Researchers have come to view this as the area where, at least with alphabetic scripts such as English and German, words are "sounded out" and assembled — that is, letters are analyzed and matched with their corresponding sounds. This word-analysis area then communicates with Broca's area and the frontal lobe, where morphemes and words — units of meaning — are recognized and overall meaning is extracted. For ideographic languages, where symbols represent whole words and often have a graphical correspondence to their meaning, sounding out of words is not part of reading.

Advanced

In advanced readers, the word-analysis area is skipped. Instead, the occipitotemporal area (behind the ear, not far from the visual cortex) becomes active. The prevailing view is that this area recognizes words without sounding them out, then that activity activates pathways toward the front of the brain that correspond to the word's meaning and mental image. Broca's area is only slightly involved.

Poor Information Design Can Disrupt Reading

Careless writing or presentation of text can reduce skilled readers' automatic, context-free reading to conscious, context-based reading, burdening working memory and thereby decreasing speed and comprehension. In unskilled readers, poor text presentation can block reading altogether. *(Each of these concepts, as well as the design implications below, are explained in greater detail in the book, which also includes examples.)*

Poor text presentation can take several forms, including the following:

- Uncommon or unfamiliar vocabulary
- Difficult scripts and typefaces
- Tiny fonts
- Text on noisy background
- Text contrasts poorly with background
- Information buried in repetition
- Centered text (or text aligned with a ragged start)

Design Implications

Information Developers can support both skilled and unskilled readers by following these guidelines:

- Avoid the disruptive flaws described earlier — difficult or tiny fonts, patterned backgrounds, centering, etc.
- Cut unnecessary text and minimize the need for reading.
- Use restricted, highly consistent vocabularies — sometimes referred to in the industry as "plain language" — or simplified language.[5] (For more information about plain language, visit the U.S. government website, www.plainlanguage.gov.)
- Format text to create a visual hierarchy to facilitate easy scanning — use headings, bulleted lists, tables, and visually emphasized words.
- Test on real users. Designers should test their designs on the intended user population to be confident that users can read all essential text quickly and effortlessly. ■

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References

1. Eagleman, David. 2015. *The Brain: The Story of You.* New York: Vintage Press
2. Sousa, David A. 2005. *How the Brain Learns to Read*. Thousand Oaks: Corwin Press.
3. Larson, Kevin. 2004. "The Science of Word Recognition." Microsoft.com. *http://www.microsoft.com/typography/ctfonts/WordRecognition.aspx.*
4. Boulton, David. 2009. "Cognitive Science: The Conceptual Components of Reading and What Reading Does for the Mind." Filmed July 2004. Video, 5:57. *www.childrenofthecode.org/interviews/stanovich.htm.*
5. Redish, Ginny. 2007. *Letting Go of the Words: Writing Web Content that Works*. San Francisco: Morgan Kaufmann.

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Information Visualization

Communicating Clearly, Efficiently, and Without Distractions

By Riccardo Mazza

Visualizing information allows us to convey complex ideas quickly and easily. With a deeper understanding of how people decode and process information, we can use careful design to minimize visual clutter and make visualizations simpler and easier to interpret.

Nowadays, we are overwhelmed by data. The diffusion of information and communication technologies, and the advent of internet and mobile devices have produced a quantity of information at an unprecedent rate. It was estimated that by 2020, for every person on Earth, 1.7 megabytes of data would be created every second.[1] This proliferation of data implies that being able to present complex, technical information is more important than ever — and we can do it more effectively by presenting information in a visual format. Information visualization, also called data visualization, is a discipline concerned with how complex technical information can be represented in graphical format, so that it can be understood and consumed in a useful way.

The Picture Superiority Effect and Human Perception

When data is represented graphically, we can exploit the "picture superiority effect." The picture superiority effect is a phenomenon in which people learn and retain information much better when it comes in the form of images rather than words.[2] It takes advantage of our innate perceptual abilities to explore, communicate, and make sense of complex phenomena. This is because the human brain can perceive particular data features and unveil the underlying structure most effectively when the data is expressed graphically.[3] The picture of superiority effect is illustrated in Figures 1 and 2.

Year	Gas	Oil	Coal
1900	64	181	5,728
1910	142	397	8,656
1920	233	889	9,833
1930	603	1,756	10,125
...	...	...	...
2017	36,586	52,568	43,360
2018	38,517	53,181	38,517
2019	39,292	53,620	43,849

Figure 1. When global trends in fossil fuel consumption (measured in terawatt hours) are presented in a table format, it's very difficult to perceive important differences over time or between fuel types. (Data from *https://ourworldindata.org/fossil-fuels*)

In Figure 1, the extract from a data table representing fossil fuel consumption over the past century can't make explicit what we immediately see from the graph in Figure 2 — the progression of fossil fuels consumption over the last century and the transition from coal as the primary fuel source towards a combination of fuels that includes oil, gas, and coal, with oil as the primary fuel source.

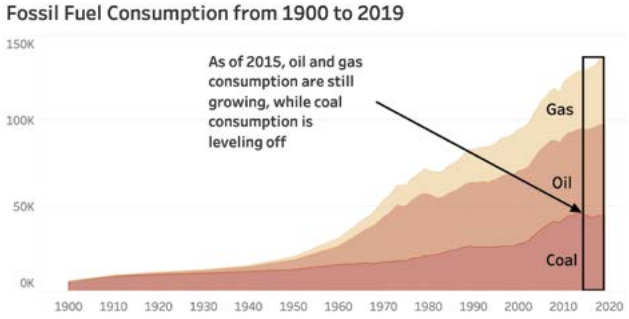

Figure 2. When global trends in fossil fuel consumption are presented graphically, it's easy to see important differences over time and between fuel types. (Data from *https://ourworldindata.org/fossil-fuels*)

The table is more difficult to interpret as it requires users to read the numbers, and reading is a complex process that requires a lot of cognitive effort. The table also forces the user to figure out which elements are important, rather than *showing* the user which elements are important with carefully selected visual attributes. The graph draws the user's attention toward the relative decrease in coal consumption in recent years with the label and arrow, as well as the highlighted area on the right. This is the intended takeaway of the visualization.

Maximizing Pre-Attentive Processing

When we look at the graph in Figure 2, we immediately perceive the huge increase of fossil fuel consumption over the last half-century. Some visual attributes, like the slope of lines in a line chart, the length of bars in a bar chart, the size and shape of a form, the color of a mark, the width of a line, and the motion of objects, are immediately identified and processed through vision, even before the complex cognitive processes of the human mind come into play. These attributes are called "pre-attentive," as they are perceived by the user almost instantaneously, without the intervention of conscious thought.[4] Enhancing these attributes so that they stand out from their surroundings, particularly for the most important data elements, draws the attention of your users and creates visual cues that can be processed pre-attentively.

Let's suppose we want to create a graph that shows which criminal offenses increased in Switzerland from 2019–2020. Figure 3 shows a slope graph where each crime type is mapped with a line, and differences are encoded through the slope, as well as quantitively with the numbers shown in brackets. Our brain is very good at comparing the slopes of different lines, hence our immediately perceiving increases, decreases, and amounts.

To create further emphasis, the types of crimes that increased in 2020 are also presented as blue lines, which increases contrast and attracts the user's attention almost immediately. In addition, the types of crimes that did not increase are presented as gray lines — gray is a neutral color that naturally recedes into the background. Notice how we chose to use just two different colors, rather than several different colors, to avoid distracting the user with unnecessary clutter. We

also chose a neutral grey for the thin, horizontal background lines, which creates contrast with the thicker foreground lines, and further directs the user's attention to the data we wish to emphasize. Colors should always be used with purpose and intent.

Graphical elements should be carefully selected, as certain elements are more effective than others for conveying specific types of information. For example, varying the lengths of bars and the position of objects on an axis are both excellent for encoding quantitative values. Lines are useful for displaying data over time. Altering the color and size of a shape is more suitable for encoding qualitative measures and for drawing the user's attention.

Minimizing Cognitive Load

When we look at a graphical representation, we see with our eyes, but we actually create *meaning* from what we see in our brain. Most of the decoding and processing of information from visualization happens in our short-term memory. This is also called "attentive processing," because it requires conscious mental effort, and users have to direct their attention and engage their memory to interpret the elements of the graphical representation. Most people can only retain 3–7 pieces of visual information in their working memory at any given time.[5] To avoid cognitive overload, we should limit the number of information items and avoid unnecessary and decorative elements. A careful design minimizes visual clutter, making the visualization simpler and easier to interpret.

For example, if we want to create a visualization of the market share of the top 13 selling films in U.S. box offices in 2020, we may decide to use a pie chart (Figure 4). Pie charts are often used to show relative proportions and percentages. However, pie charts pose some important issues. Particularly, we read pie charts by area of the slices,[6] and research shows that our visual perception is not good at accurately assigning quantitative values to areas, and that shapes are difficult to compare if they are close in size.[7,8] Moreover, color-coded labels force the user to continuously glance back and forth between the legend and the pie, and people who are color blind may not be able to distinguish one element from another. This not only requires more effort for interpretation but can also result in ambiguity and misinterpretation.

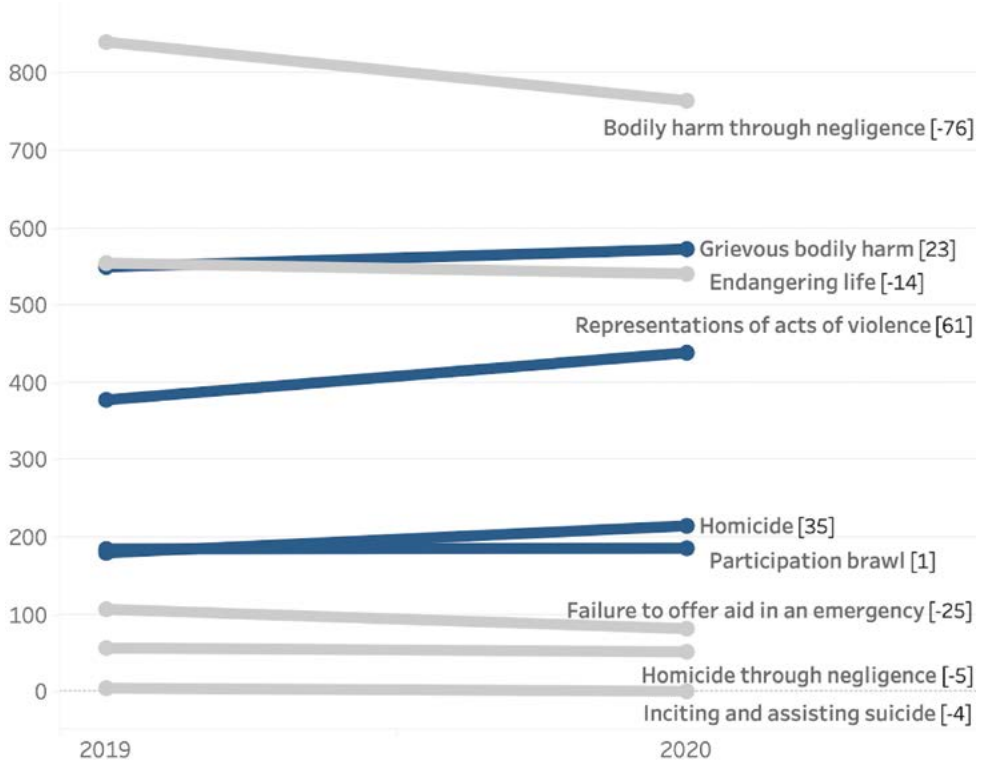

Figure 3. This graph, which shows the change in Swiss criminal offenses from 2019–2020, draws the user's attention to crimes that have increased by creating contrast between the foreground and the background, and between crimes that increased (blue lines) and those that did not (gray lines). (Data from Swiss Federal Statistics Office)

In contrast to the pie chart, a bar chart (Figure 5) makes comparing items much easier, and the relationships between elements are much more apparent. As a general rule, when the number of items is more than three, or when you want to evaluate the relative size of items, a pie chart should always be replaced by a simple (and more effective) bar chart. Because the bars are plotted on a common baseline, the comparison of values is much easier.

Designing Information Visualizations

One question people often ask when approaching information visualization is, "How do I create a *good* information visualization?" It's a nuanced process that involves multiple variables and making the type of distinctions and decisions that only the human brain can make. There are no rote recipes for effective information visualization, but you can cultivate these skills by developing a deeper understanding of the science behind vision, perceptual psychology, and cognitive science. Good visualization should convey complex data to the user clearly, efficiently, and without distractions. But above all, it should be useful to users who are seeking to answer a question or solve a problem. Visualization design should be guided by a clear understanding of the intended audience and how the visualization serves the needs of that audience. When designing visualizations, ask yourself, "Do I want my users to make an informed decision based on the data?" Or to learn something? Or simply to reflect on the data?

There are no rote recipes for effective information visualization, but you can cultivate the necessary skills by developing a deeper understanding of the science behind vision, perceptual psychology, and cognitive science.

Conclusion

Creating a good visualization is a matter of substance and simplicity. Above all, visualizations should serve a clear purpose. Just because you have data available does not mean that you should represent everything in visual format. When designing a visualization, make design choices that are based on target audiences. What does your audience expect from a visualization? What is the desired outcome? What is the insight you want to convey? Maybe we want to show a trend over time (Figure 2), emphasize a particular relationship between data items (Figure 3), or show how distinct parts are arranged to form a whole (Figures 4 and 5).

Choose relevant data and a visual format that minimizes cognitive load by triggering automatic (pre-attentive) *recognition*, rather than requiring conscious (attentive) *interpretation*. Avoid cluttering the visualization with unnecessary background elements, chart borders, gridlines, or decorations. Use labels, colors, and other attributes that draw attention to important information and account for the limits of human

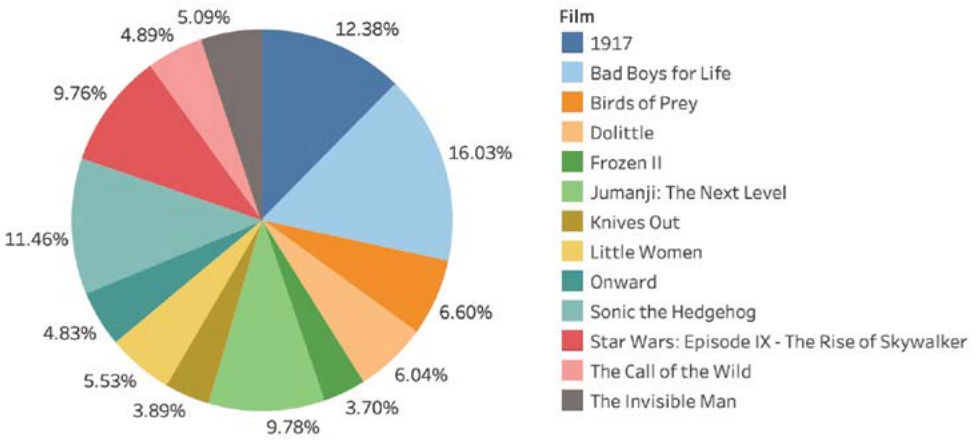

Figure 4. The use of a pie chart to depict the market share of top 13 selling films in U.S. box offices in 2020 results in too much cognitive load. (Data from *boxofficemojo.com*)

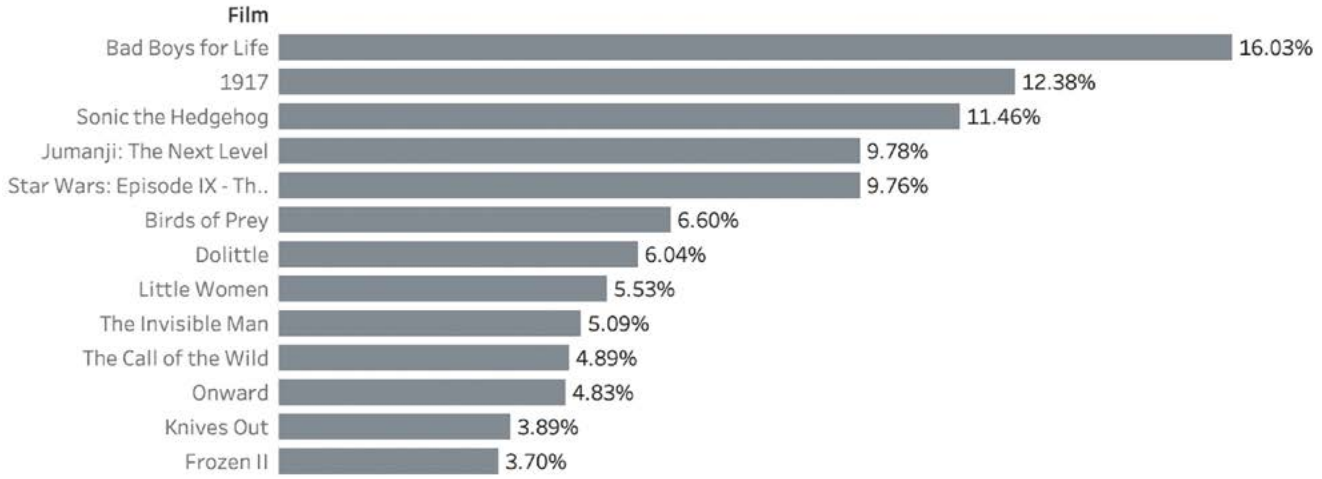

Figure 5. The use of a bar chart to depict the market share of top 13 selling films in U.S. box offices in 2020 results in much less cognitive load than a pie chart, and it's much easier to perceive the differences between elements. (Data from *boxofficemojo.com*)

perceptual abilities. Remember that there is always something interesting in a data set, and you just need to understand what is relevant to your users.

Learn More

If you're interested in learning more about information visualization, perception, and cognition, please refer to the works of Edward Tufte,[3,9,10] Stephen Few,[5,8,11] and Riccardo Mazza.[12] ■

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References

1. Domo Inc. n.d. "Data never sleeps 6.0. How much data is generated every minute?" *https://www.domo.com/assets/downloads/18_domo_data-never-sleeps-6+verticals.pdf*
2. Paivio, Allan. 1971. *Imagery and Verbal Processes.* New York: Holt, Rinehart, and Winston.
3. Tufte, Edward R. 1983. *The Visual Display of Quantitative Information.* Chesire, CT: Graphics Press.
4. Healey, Christopher and James Enns. 2012. "Attention and Visual Memory in Visualization and Computer Graphics." *IEEE Transactions on Visualization and Computer Graphics* 18, no. 7 (July): 1170–88.
5. Few, Stephen. 2004. *Show Me the Numbers: Designing Tables and Graphs to Enlighten.* El Dorado Hills, CA: Analytics Press. ISBN 0970601999
6. Skau, Drew and Robert Kosara. 2016. "Arcs, Angles, or Areas: Individual Data Encodings in Pie and Donut Charts." *Computer Graphics Forum,* 35: 121-130.
7. Cleveland, William S. and Robert McGill. 1986. "An Experiment in Graphical Perception." *International Journal of Man-Machine Studies* Volume 25, no. 5: 491-500, ISSN 0020-7373
8. Few, Stephen. 2004. "Tapping the Power of Visual Perception." *Perceptual Edge.*
9. Tufte, Edward R. 1990. *Envisioning Information.* Cheshire, CT: Graphics Press. ISBN 0961392118
10. Tufte, Edward R. 1997. *Visual Explanations.* Cheshire, CT: Graphics Press, Cheshire. ISBN 0961392126
11. Few, Stephen. 2021. *Now You See It: An Introduction to Visual Data Sensemaking.* El Dorado Hills, CA: Analytics Press. ISBN 978-1938377129
12. Mazza, Riccardo. 2009. *Introduction to Information Visualization.* London: Springer-Verlag London. ISBN 978-1-84800-219-7

Bidirectional User Interfaces

The Need for Evidence-Based Design

By Yulia Goldenberg and Noam Tractinsky

Research shows that intuition, idiosyncratic knowledge, and even practical, reasoned judgment are insufficient when making design decisions for a global audience. Instead, we need systematic, evidence-based guidelines to improve user comprehension and increase the likelihood of successful interactions.

The rapid growth of digital technology and worldwide internet proliferation has accelerated efforts to localize and adapt the user interface (UI) of interactive systems and websites to numerous languages and cultures. However, this may not be such a straightforward task, especially for a group of languages that radically differ from the UI's original language. Such languages not only use different characters, but are also written and read from right to left, rather than from left to right, which is the dominant writing direction on the web. The common term for this group is "right-to-left languages."

More accurately, though, these languages rely on unique bidirectional (BiDi) writing systems that mix the native right-to-left script with left-to-right strings. (A "string" is a set of characters in the text — usually a word, a phrase, or a sentence.) Left-to-right strings include phrases in Latin script, numbers, and other notations, such as

those shown in Figure 1. Speakers of BiDi languages, such as Arabic, Hebrew, Persian, and Urdu, comprise 12 percent of the world population.[1]

Figure 1. Efforts to localize user interfaces often result in unique bidirectional (BiDi) writing systems that mix right-to-left and left-to-right writing systems.[2] In this example from IKEA's United Arab Emirates website, the design on the top is in English (left-to-right), and the design on the bottom includes strings in modern Arabic (right-to-left).[2]

For BiDi languages, the software localization process should include not only translating text into the target language but also determining the direction of interface elements. At first glance, this task does not seem so challenging — why can't we simply transpose, or mirror, the directionality of the source language? In fact, many designers do just that.

But, in reality, such a seemingly sensible rule may result in designs that are ambiguous or just plain wrong. For example, consider the progress bar, media player buttons, and star rating in Figure 2. Should they be mirrored when presented on a BiDi interface?

Figure 2. Should elements such as progress bars (a), media player buttons (b), and star ratings (c) be mirrored when presented on a BiDi interface?

Major software companies have addressed these issues to some extent. Google's *Material Design* guidelines provide an elaborate localization scheme that suggests which UI elements should be mirrored and which should not. For example, according to the guidelines, the progress bar should be mirrored, whereas the media player buttons should not. The star rating element? There is no guideline for that.

While many of the guidelines appear reasonable, they are not comprehensive. For example, in a recent study[3] we found many UI elements that are not accounted for in existing guidelines. In addition, the localization guidelines do not seem to be based on empirical evidence. In our research, we discovered discrepancies between the current localization guidelines and what Hebrew users actually prefer. For example, Google recommends presenting the localized timeline element (Figure 3) and double slider (Figure 4) as right-to-left, whereas the BiDi users in the study preferred left-to-right.

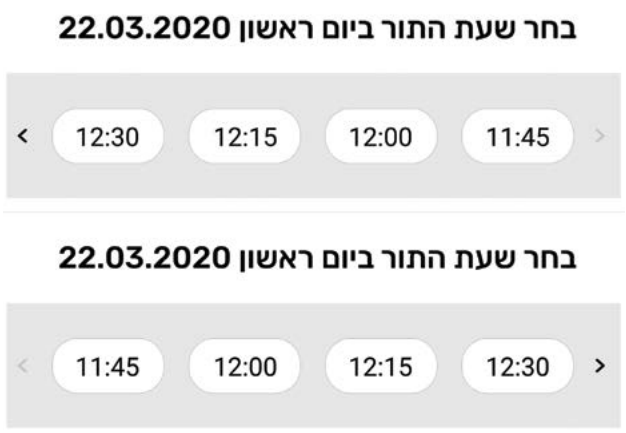

Figure 3. Timeline — Google recommends presenting the localized timeline element as right-to-left (top), whereas we found that users preferred left-to-right (bottom). The Hebrew text reads, "Select an appointment time for Sunday, March 22, 2020."

The Complexity of BiDi Design

Rules and conventions for script directionality in BiDi languages vary depending on countries and cultures. For example, the appropriate direction for mathematical notations in Israel (Hebrew)

and Morocco (Arabic) is left-to-right, using Latin script. In contrast, in most Middle East Arabic countries, the proper direction is right-to-left, using Arabic script.[3]

Moreover, we found that users' preferences are often contingent on various contextual and personal factors. The findings point to the complexity of this seemingly trivial design issue and underline the need for empirical evidence as a basis for designing BiDi user interfaces.

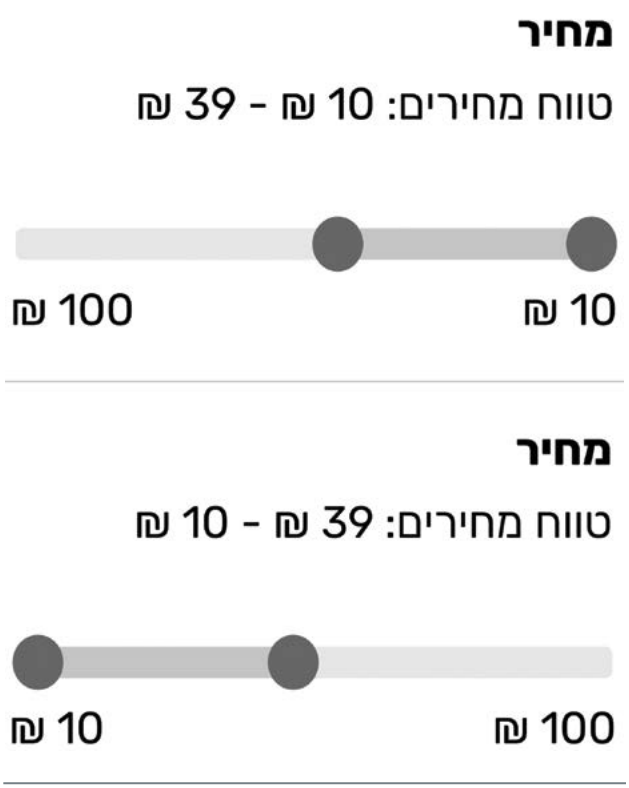

Figure 4. Double Slider — Google recommends presenting the double slider element as right-to-left (top), whereas we found that users preferred left-to-right (bottom). The Hebrew text reads: "Price" (in bold) and "Price range: 10NIS-39NIS."

Language, including script directionality, affects cognition. Thus, speakers of BiDi languages may construct certain aspects of the world differently than speakers of left-to-right languages. Moreover, empirical studies studies[4,5] have shown that various factors can affect the variations in direction preferences of BiDi speakers. These factors include the BiDi language specifics, context of usage, and the degree to which the users are proficient in left-to-right languages or in the sciences, which require extensive use of left-to-right scripts for programming and for elements such as formulas and charts.

For example, in a psychological study on preferences for the "quantity" (more-less) direction, the majority of Arabic speakers demonstrated right-to-left preference, (with "less" on the right and "more" on the left). In contrast, Hebrew speakers mainly demonstrated left-to-right preference.[6]

Our study of Hebrew speakers found that users' backgrounds led to different interpretations of the string "Sale 1+2" (Figure 5), which is used in some European countries to indicate that users will receive a discount after purchasing a certain number of items. Engineering students (who are experienced in left-to-right coding and mathematics) showed a tendency to read this string from left to right ("buy one, get two"). In contrast, ordinary users and UI professionals tended to read this information from right to left ("buy two, get one").

Figure 5. Promotional text, which indicates that users will receive a discount if they purchase a certain number of items, was interpreted differently by different Hebrew users.[3] While some users interpreted it as "buy one, get two," others interpreted it as "buy two, get one." The text reads, "Sale."

We observed similar differences in how Hebrew speakers interpreted the ambiguous star rating element (Figure 2c). Engineering students tended to interpret the element from left to right (so that the lower rating is on the left), whereas UI professionals showed the opposite tendency.

Given these complexities, how should we address the challenge of BiDi interface design?

Determining Direction

Designers of BiDi interfaces currently use three main strategies to determine the direction of a specific UI item.

The first approach is the naive approach, which suggests full mirroring of all UI elements under the assumption that right-to-left languages are simply written in the opposite direction from left-to-right languages. We have already hinted at the deficiencies of this approach. For yet another example, consider Figure 6, in which a date selector is presented in Hebrew. This fully mirrored design flipped the original direction of all the elements. In Hebrew, the right UI component, which includes the day and date, can be read from right to left. However, the information in the left component (contained in a red frame) should only be read from left to right in the form hh:mm.

Figure 6. Full mirroring of all UI elements a BiDi interface can render some information incomprehensible, such as the hour-minute component in this example from Israel Railways mobile application.[7] The title reads "Select date and time." The rightmost component displays the day of the week and the date. The leftmost component (outlined in red) displays hours and minutes.

A second approach is to rely on BiDi design guidelines provided by major software companies such as Microsoft, Google, and Apple. However, the use of these guidelines is not supported by evidence, they only cover a portion of UI elements, and they do not provide guidance for the direction or position of many common UI elements, such as star ratings, numerical ratings, vertical scroll bars, paginator and toggle elements, and many more. Our research has also found cases in which tendencies and preferences of BiDi users contradicted existing guidelines (Figures 3 and 4).[4,8]

To avoid ambiguous, frustrating design that results in user misunderstanding and dissatisfaction, it is critical to apply scientific methods and to develop evidence-based guidelines.

Another option is to seek help from native BiDi language speakers, who might be a member of the development team, for example, programmers or product managers. But our research found no guarantee that consulting two different native BiDi speakers will generate the same answer. The reason is that such answers depend on personal knowledge or anecdotal professional experience, including colleagues' opinions and user feedback from different contexts. Numerous examples with inconsistent direction usage of UI elements in local BiDi interfaces (Figure 7) attest to the shortcomings of this approach.

Given the limitations of existing approaches, it is obvious that intuition, idiosyncratic knowledge, and even practical, reasoned judgment are not enough to determine how BiDi UI elements should be presented. It is also clear that BiDi languages are sufficiently diverse to preclude one-size-fits-all solutions. Furthermore, BiDi users' preferences are mediated by national, cultural, personal, and various contextual factors. Thus, we argue that the only way forward should rest on systematic efforts to untangle those contingencies and to provide empirical evidence as a basis for design guidelines that genuinely consider the complexity of the BiDi design space.

BiDi languages pose unique, and often idiosyncratic, challenges to designers of interactive systems. Current solutions yield incomplete, inconsistent, and at times even whimsical results. This, in turn, leads to ambiguous, frustrating design, resulting in user misunderstanding and dissatisfaction with the interface. It is therefore

critical and urgent to apply scientific methods to address those challenges and to develop evidence-based guidelines for BiDi user interfaces. ■

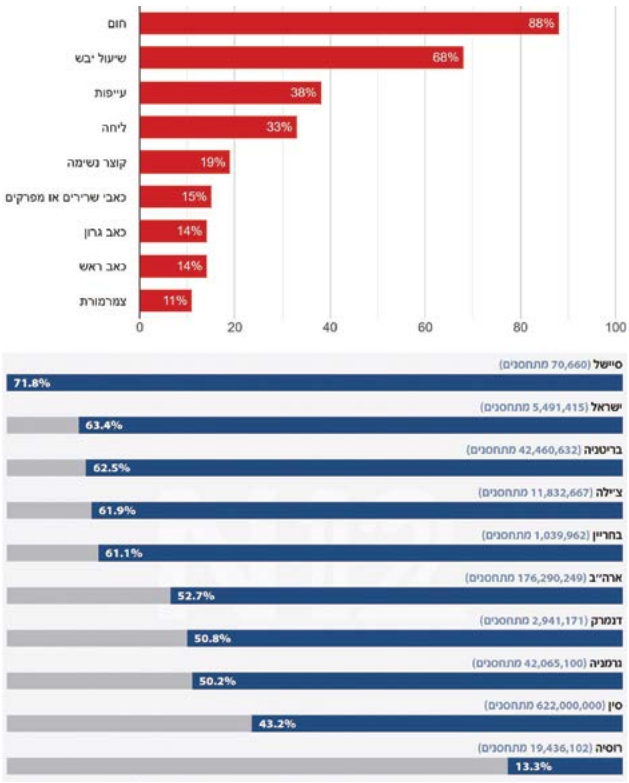

Figure 7. Because BiDi design guidelines are not based on empirical evidence, there are numerous examples of inconsistent direction usage in UI elements, as in these two bar charts — both of which were localized for Hebrew websites. Top: Left-to-right bar chart[9] Bottom: Right-to-left bar chart[10]

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References

1. Eberhard, David M., Gary F. Simons, and Charles D. Fennig (eds.). 2021. *Ethnologue: Languages of the World*, 24th ed. Dallas: SIL International *https://www.ethnologue.com/guides/ethnologue200.*
2. IKEA UAE. 2021. "BRIMNES Dressing table". Accessed 9 June 2021. *https://www.ikea.com/ae/ar/p/brimnes-dressing-table-white-70290459/.*
3. Goldenberg, Yulia, and Noam Tractinsky. 2021. "Towards the Right Direction in BiDirectional User Interfaces." In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–13. CHI '21. New York, NY, USA: Association for Computing Machinery, 2021. *https://doi.org/10.1145/3411764.3445461.*
4. Román, Antonio, Abderrahman El Fathi, and Julio Santiago. 2013. "Spatial Biases in Understanding Descriptions of Static Scenes: The Role of Reading and Writing Direction." *Memory & Cognition*, vol. 41, no. 4: 588-599. *https://doi.org/10.3758/s13421-012-0285-2.*
5. Shaki, Samueal, Martin H. Fisher, and William M. Petrusic. 2009. "Reading Habits for Both Words and Numbers Contribute to the SNARC Effect." *Psychonomic Bulletin & Review*, vol. 16: 328–331. *https://doi.org/10.3758/PBR.16.2.328.*
6. Tversky, Barbara, Sol Kugelmass, and Atalia Winter. 1991. "Cross-Cultural and Developmental Trends in Graphic Productions." *Cognitive Psychology* 23, no. 4 (October): 515–57. *https://doi.org/10.1016/0010-0285(91)90005-9.*
7. Israel Railways Mobile Application, Hebrew version. Accessed 3 October 2019.
8. Google. n.d. "Usability–Bidirectionality." Material Design. Accessed 20 June 2021. *https://material.io/archive/guidelines/usability/bidirectionality.html.*
9. Walla News. 2021. "**התפשטות הקורונה**". Accessed 10 June 2021. *https://news.walla.co.il/corona.*
10. Mako website. 2021. "**מספר המתחסנים נגד קורונה בעולם**". Accessed 20 June 2021. *https://corona.mako.co.il/.*
11. World Wide Web Consortium (W3C). 2006. "Arabic Mathematical Notation," 31 January 2006 *https://www.w3.org/TR/arabic-math/#Comparison.*

Debunking the Myth of Learning Styles

A Case for Evidence-Based Instruction and Communication

By Xin Sun

We need to learn to recognize, question, and verify the underlying beliefs that influence how we develop instructional and technical content. Basing content-related decisions on scientific evidence, rather than myths, allows us to focus on what really matters.

The myth of learning styles has become pervasively influential in numerous fields concerning learning and instruction. Despite its popularity, the concept of learning styles has never been supported by scientific evidence. Creating content based on the myth of learning styles can have serious and negative consequences in all fields of communication, including educational sciences, instructional design, and technical communication.

What Are Learning Styles?

The idea of "learning styles" proposes that every individual learns in a different way, and that instructional content is most effective when it matches an individual's specific mode (or style) of learning.

While there are many learning style models, they all involve two basic propositions:

- The way people learn can be classified into different "styles" based on individual preference. This preference is often correlated with a specific sensory mode. For example, one of the most popular learning style models is the VAK model, which suggests three learning styles: visual, auditory, and kinesthetic styles.[1]
- Individuals achieve better learning outcomes when the instructional content matches their learning styles. For example, visual learners

learn best through seeing graphical items, auditory learners learn best through listening (e.g, lectures), and kinesthetic learners learn best through physical action.

What the Evidence Tells Us

The idea of learning styles is appealing, and it is not entirely wrong. It *is* correct that individuals learn in different ways and have different learning outcomes, even when interacting with the same instructional content. Some people learn faster than others. And many people do have a strong personal preference for certain types of instructional content.

We need to learn to recognize and question our intuitive beliefs to determine whether they are supported by actual evidence before dedicating time and other resources to developing instructional content.

Although intuitively appealing, the notion of learning styles lacks sound, evidence-based research to back up its major claims. Unfortunately, there are many peer-reviewed publications that claim to have found cause-and-effect relationships between learner preference, content type, and learning outcomes.[2] However, while many of these studies *do* verify a strong personal preference for a certain type of instructional content, they do not validate the cause-and-effect relationship. In many of these studies, the methodology, reasoning, or both, are deeply flawed.

In one well-designed study,[3] researchers used several validated questionnaires to identify students' learning styles as either "visual" or "verbal." Students were then randomly assigned a learning session with either picture-based or word-based content. While the questionnaires efficiently separated the visual learners from verbal learners, the groups did not differ in their learning outcomes. In other words, learning styles did not matter — when engaging with the picture-based content, those with a strong preference for visual content did not learn better than those with a strong preference for word-based content.

While learning styles have not been scientifically validated, researchers have found several other legitimate reasons for differences in learning success,[2] and these include, but are not limited to:

- Talent or aptitude
- A high degree of motivation
- Relevant prior knowledge

Indeed, learning outcomes vary for many reasons; however, learning styles is not one of them. As summarized in a 2008 literature review of learning styles, "Although the literature on learning styles is enormous, very few studies have even used an experimental methodology capable of testing the validity of learning styles applied to education."[2]

Perhaps most importantly, these well-designed studies often support the use of multimedia learning environments. Research shows that presenting materials in various ways, rather than through a single modality, results in optimal learning.[2]

The Detrimental Effects of the Learning Style Myth

The prevalence of the learning style myth has several negative consequences. It shifts attention away from the factors that may really matter to learning. Students (and their guardians) may focus on finding and engaging with content that matches with their ostensible learning styles, rather than on more effective learning techniques.

The myth perpetuates the belief that instructional materials should be designed to fit the needs of different learners. Thus, people who develop instructional content are likely to invest time and effort in creating various types of content that do not actually benefit students at all. While instructors spend time and other resources on assessing student learning styles, and on creating and assigning different content types to different students, they are neglecting

important cognitive and motivational factors that have a real effect on learning outcomes.

As educational psychologist Dr. Daniel Willingham puts it, we should focus on the individual differences that really matter:

> We shouldn't congratulate ourselves for showing a video to engage the visual learners or offering podcasts to the auditory learners. Rather, we should realize that the value of the video or audio will be determined by how it suits the content that we are asking students to learn and the background knowledge, interests, and abilities that they bring to it.[4]

The learning style myth is also detrimental on a broader scale. It is already embedded in many teacher training programs as one of the guiding principles of pedagogy. Moreover, in 29 U.S. states, this myth is included in government-distributed exam preparation materials.[5] This widespread doctrine passes on misguided beliefs and behaviors and will continue to result in wasted efforts for future generations of both instructors and students.

Looking Ahead: Toward an Evidence-Based Approach

Clearly, it is important to refrain from approaching instruction and communication with a learning-style mindset. In a larger sense, it is also important to learn how to avoid the pitfalls of similar myths in the future. It is critical to learn how to use sound reasoning and approach all content decisions in an evidence-based way. We need to learn to recognize and question our intuitive beliefs to determine whether they are supported by actual evidence before dedicating time and other resources to developing instructional content. We also need to learn how to assess the credibility of various claims and sources — even peer-reviewed publications.

Our research found that more than 90 percent of the people we surveyed believed in the myth of learning styles.[6] When asked why, most participants referred to deeply personal experiences, and responded with statements such as, "My kid has a learning style." Such individual personal experiences are not a sound basis for an evidence-based approach.

The good news is our study included teaching participants about the science behind the learning style myth, and more than half of our participants altered their beliefs. When asked to explain this shift, most of them mentioned, "Studies showed..." This indicates that people can be educated and persuaded to abandon misleading myths in favor of an evidence-based approach that allows us to focus on what truly matters for improving learning outcomes. ■

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References

1. Franklin, Shirley. 2006. "VAKing out Learning Styles—Why the Notion of 'Learning Styles' Is Unhelpful to Teachers." *Education 3-13*, 34 (1): 81–87. *https://doi.org/10.1080/03004270500507644.*
2. Pashler, Harold, Mark Mcdaniel, Doug Rohrer, and Robert Bjork. 2008. "Learning Styles: Concepts and Evidence." *Psychological Science in the Public Interest*, 9 (December): 105–19. *https://doi.org/10.1111/j.1539-6053.2009.01038.x.*
3. Massa, L. J., & Mayer, R. E. 2006. Testing the ATI hypothesis: Should Multimedia Instruction Accommodate Verbalizer-Visualizer Cognitive Style?". *Learning and Individual Differences*, 16 (4), 321–335. *https://doi.org/10.1016/j.lindif.2006.10.001*
4. Riener, C., & Willingham, D. 2010. "The Myth of Learning Styles." *Change: The Magazine of Higher Learning*, 42 (5): 32-35. *https://doi.org/10.1080/00091383.2010.503139*
5. Furey, William. 2020. "The Stubborn Myth of 'Learning Styles.'" *Education Next*, 20 (3). *https://www.educationnext.org/stubborn-myth-learning-styles-state-teacher-license-prep-materials-debunked-theory/*
6. Nancekivell, S., Sun, X., Gelman, S., & Shah, P. (Accept pending revision under Cognitive Science). "A Slippery Myth: How Learning style Beliefs Shape Reasoning About Multimodal Instruction and Related Scientific Evidence."

Want to Write for *Intercom*?

If you have an idea for an article relating to technical communication, *Intercom* magazine would like to hear from you. Please write a 100-word summary of your article idea and send it to intercom-editor@stc.org.

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Tips Before Submitting

There are four questions you can ask yourself before you start writing that will save time in the writing and revising phases. Answering these questions also makes writing easier and more fun, because it keeps you from making frustrating false starts or detours.

Does it fit with an issue topic?

Check the *Intercom* editorial calendar at www.stc.org/intercom to see if it fits with an upcoming theme.

Who is your audience?

You may decide your audience is a subset of technical communicators, such as "technical communicators who use software package Z," or "technical communicators who manage a large team," or "technical communicators who must produce documentation in three languages simultaneously." There are many such subsets, and they're all among *Intercom*'s audience. Just be sure to identify this audience in the first few paragraphs of your article, so that readers can know whether the information is relevant to them.

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Intercom's charter is to "provide practical examples and applications of technical communication that will promote its readers' professional development." Basically, this means that *Intercom*'s feature articles should provide our readers with information that helps them do their jobs better or find better jobs. If your article isn't doing one of these two things, odds are it's not right for *Intercom*.

So, if your article illustrates a better technique for editing documents, then your answer to question 2 might be "Using my article, technical editors will be able to do their work more efficiently." If your article suggests ways to find work in technical marketing, your answer might be "My article will help *Intercom*'s readers explore new options in the technical communication field."

Technical communication is a diverse, evolving field, so no single article will provide the definitive approach or the final answer to a professional dilemma. But your article can, and should, provide new information or a new way to solve a problem.

Why should they care?

You know who your audience is, and what you hope they'll do differently after reading your article. At some point early in your article you should explain to them, in one sentence, why they should care. In other words, point out the positive advantages of applying your article.

If this sounds like a thesis sentence, that's because it is. You're promising your audience that you've got useful information and that they should keep reading. The rest of the article is just living up to that promise. ■

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Upcoming Online Courses

Presentation Skills Master Class

Presenter: Leah Guren
5–19 October 2021
11:00 AM to 1:00 PM EST (GMT-4)
Registration closes 28 September 2021.

Now, more than ever, you need to be able to present yourself and your ideas clearly and effectively. Poor presentation skills can hold you back in your career and allow others to take credit for your ideas. In contrast, good speakers get promoted faster and earn more, plus they are exposed to more opportunities than their colleagues who present poorly.

This workshop involves hands-on exercises, games, and performance time. Even if you are already a confident speaker, you can learn techniques to improve your performance.

It's time for you to stop hiding in the background and start enjoying the spotlight!

Objectives:

- Edit down your ideas to create a focused, organized presentation
- Catch the audience's attention with a great introduction
- Connect your key points to keep the audience engaged and on track
- Remember your content without reading from notes
- Avoid the most common mistakes
- Handle questions with confidence
- And more!

Note: This is a highly interactive workshop. All participants must enable their computer camera and microphone during their presentations and agree to be recorded.

Introverts and Leadership One

Presenter: Ben Woelk, CISSP, CPTC
11 November to 16 December 2021 (Thursdays)
Noon to 1:00 PM EST (GMT-5)
No class on 25 November.

How does an introvert lead? Introverts don't fit the stereotypical leadership model in management literature. They're often unaware of their introvert strengths and how to maximize them in the workplace, much less become leaders. However, Cain, Laney, Kahnweiler, and others have increased our understanding of introversion and how it impacts leadership styles.

This course will explore the recent literature on introversion and the workplace, tools and techniques for discovering introvert strengths, and strategies for leveraging them. Students will identify success factors for introverts in leadership roles and will develop action plans for individual development.

The course combines 5 weeks of readings and other resources, online discussions, interviews with introverted leaders, and short reflection papers with a virtual workshop on improving verbal communication skills through improvisational exercises.

Objectives:

- To develop knowledge of recent literature on introversion and the workplace
- To develop understanding of introvert strengths
- To apply introvert strengths to leadership
- To improve verbal communication skills as leaders
- To develop individual strategies for leadership development

Access to the following books are required for this course:

- *Quiet: The Power of Introverts in a World That Can't Stop Talking* by Susan Cain, any edition. This book has had a profound impact on many introverts reading it for the first time and has sparked an introvert movement in the workplace.
- *Please Understand Me II, Temperament, Character, Intelligence* by David Keirsey. There is a *Please Understand Me* and a *Please Understand Me II*. Make sure you get the right one. This book will help you understand your online temperament inventory results.
- *If I Understood You, Would I Have This Look On My Face? My Adventures in the Art and Science of Relating and Communicating* by Alan Alda. ■

Register at **www.stc.org/education/online-courses/**

"Kelsey & Ben's Mentoring Journey" Highlights an Excellent Adventure

Mentorships bring more than just skill improvements.

Few professional relationships match the importance of a mentor and mentee. One teaches through the wisdom of experience while the other through enthusiasm and eagerness to contribute. United, the pair can push forward any goals.

Ben Woelk, CISSP, CPTC, and Kelsey Loftin have such a relationship. Woelk, the mentor, Loftin, the mentee, joined together as speakers for their session titled "Kelsey & Ben's Excellent Adventure: A Mentoring Journey."

What eventually blossomed into a mentorship began as a simple LinkedIn post in 2017.

The Mentor Meets the Mentee

Woelk pitched an article about introverted leadership and technical communication to Liz Pohland, then editor of *Intercom.* In return, Pohland offered Woelk the chance to be guest editor of the next issue to delve into the subject.

Woelk called for contributions on LinkedIn. Loftin responded to the post to direct Woelk to a friend. Fortunately, the pair happened to speak about shared interests, and Woelk discovered Loftin was interested in writing about the usefulness of the Myers-Briggs test and others like it. Loftin believed they could be great tools for creating user profiles with personas for tech writers, designers, and engineers.

But mentor-mentee relationships take time to develop. Woelk and Loftin worked as collaborators on projects for *Intercom* and grew to know each other. When Woelk launched a podcast, he set up a Patreon page to create cover art. Loftin, through her own graphic design experience, stepped in to help. And, when Loftin struggled with anxiety and depression, Woelk was there for her.

Soon, the pair decided it was time their relationship evolved into a more formal mentorship.

Making Mentorships Work

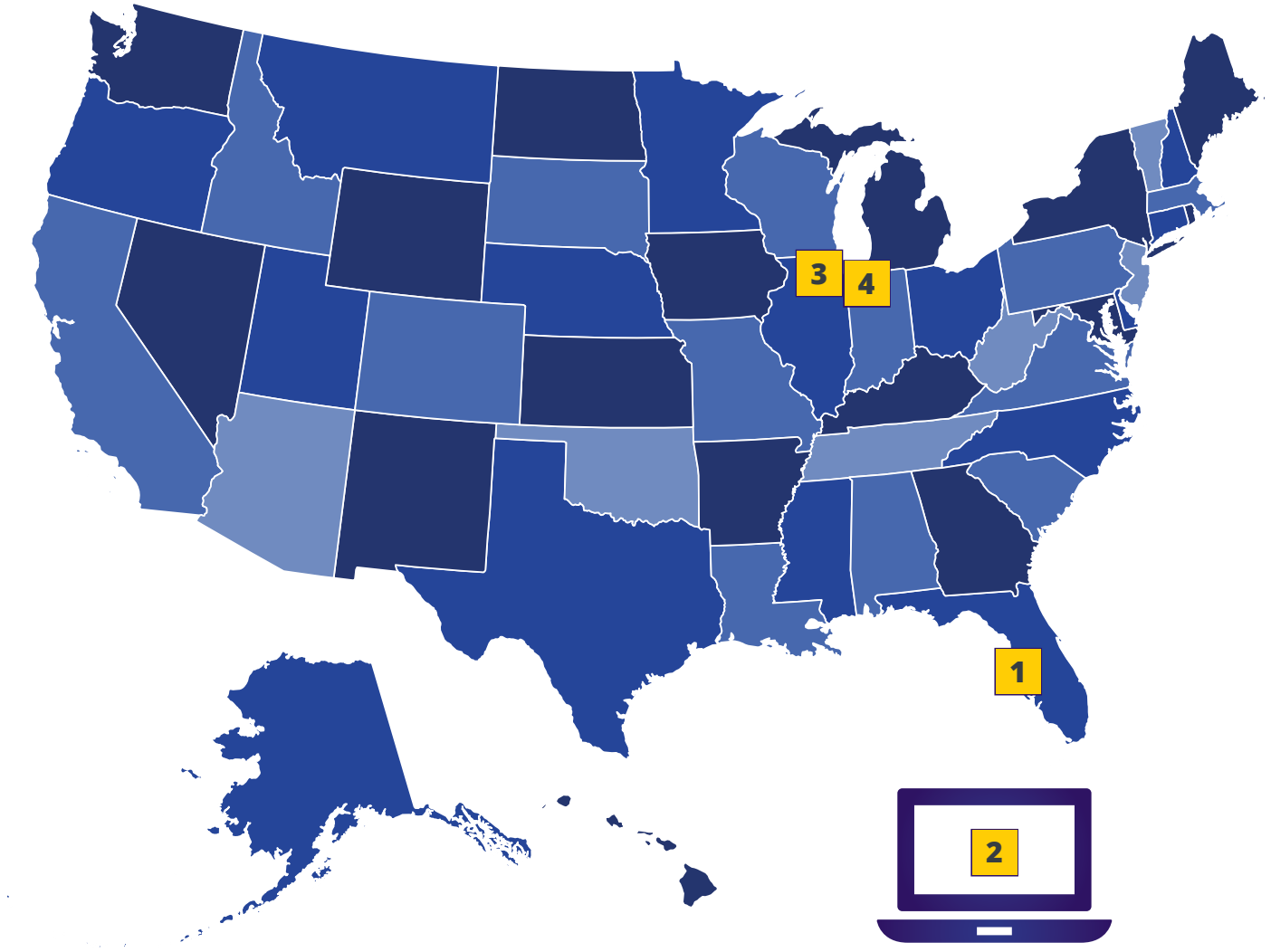
So, how did Woelk and Loftin create such a strong bond? During their session, the pair emphasized bidirectional relationships, which means both the mentor and mentee learn and grow. For Loftin, that two-way street allowed her to bring her own skill set, even as a mentee.

Woelk said to make a mentor-mentee relationship work depends on what benefits both parties. A productive mentorship can be structured with checkpoints and a curriculum, or, like he and Loftin, an unstructured approach may be best.

Still, the pair preached the most important first step for any mentor-mentee relationship was honesty and vulnerability. ■

To watch this session and more from STC's 2021 Summit, visit **www.stc.org.**

Industry Events



1. Association for Business Communication
86th Annual International Conference
18-23 Oct. 2021
(HYBRID)
Tampa, FL

2. American Medical Writers Association
2021 Medical Writing & Communication Conference
27-29 Oct. 2021
(Virtual)

3. Society for Technical Communication
2022 Technical Communication Summit Conference & Expo
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Rosemont (Chicago), IL

4. Society for Scholarly Publishing
44th Annual Meeting
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What Type of Editor are You?

BY MICHELLE CORBIN | STC Fellow

While all kinds of editing are important and necessary, the scope and substance of an edit can vary dramatically. When we're thrown into roles where we have to wear all of the editing hats, it's important to remember that focusing on structure, logic, and organization will do more for content comprehension than focusing on grammatically correct sentences.

I love being a technical editor. I think that I am a really good developmental editor, but just an OK copy editor. To be a really good technical editor, I think that you have to excel at analysis-based content editing (developmental editing); you can't just focus on the rules and the words and the sentences (copy editing).

Let's start by looking at the evolution of the types of edits, and then dig deeper into my favorite type of editing, developmental editing, also known as substantive or comprehensive editing.

Types of Edits

In the early days of technical communication, to help define the technical editing tasks, Robert Van Buren and Mary Fran Buehler published the now-classic document, *Levels of Edit*.[1] It collected nine types of edits — coordination, policy, integrity, screening, copy clarification, format, mechanical, language, substantive — into five levels (Table 1, 5).

In the early days of my technical communication career, when I was just starting out in technical editing, I read the Judith A. Tarutz book, *Technical Editing: The Practical Guide for Editors and Writers*,[2] which defined six informal levels — turning pages, skimming, skimming and comparing, reading, analyzing, testing and using (165) — and three types of edits — developmental, copy and literary, and production (5). Her book most certainly shaped my view of technical editing.

My favorite types of edits in the later days of my technical communication career are Weber's negotiation-based types — rules-based editing (copy editing, where changes are *not* negotiated) and analysis-based editing (substantive editing, which she equates to developmental editing or comprehensive editing, where suggested changes *are* negotiated). Her take on identifying three types of rules (essential, non-essential, and fake) also resonates with me, which I talked about in a previous *Intercom* column, "Playing by the Rules."[3]

Table 1. The Scope of the Five Types of Editing. (From *Levels of Edit,* Table 0-1)[4]

Type of Edit	Level of Edit				
	Level 1	Level 2	Level 3	Level 4	Level 5
Coordination	X	X	X	X	X
Policy	X	X	X	X	X
Integrity	X	X	X	X	
Screening	X	X	X	X	
Copy Clarification	X	X	X		
Format	X	X	X		
Mechanical Style	X	X			
Language	X	X			
Substantive	X				

The textbook used in most graduate and undergraduate programs today is Carolyn D. Rude and Angela Eaton's *Technical Editing* (fifth edition).[5] They boiled all this down to just two types of editing: comprehensive editing and copy editing. Linda Oestreich and I focused on these two types of edits in our "Technical Editing Fundamentals" STC certificate course,[6,7] but we called out a legal edit as a nod back to the classic nine from Van Buren and Buehler and their policy edit.

Substantive vs. Comprehensive vs. Developmental

Over time, people started to consider substantive editing, comprehensive editing, and developmental editing as synonyms. I think they are more the same than not, but let's look a bit further at this analysis-based (as opposed to rule-based) type of editing. Like any good technical communicator, technical editors must understand their users and understand the topic space to be able to analyze the content they are editing.

When technical editors complete comprehensive edits, they focus on these writing characteristics:

- Coherence
- Logic
- Structure
- Scope
- Usability

During comprehensive edits, technical editors focus on the topic-level or paragraph-level of the content, and not so much on the sentence-level. They focus on the organization and navigation of the content. From a style perspective, technical editors focus on sentence complexity and overall voice, but not on any grammar or style rules (unless the error is just jumping off the proverbial page at them).

Ideally speaking, technical editors complete comprehensive edits before and separate from any other type of edits that your team defines. However, in all my years as a technical editor, I've rarely had the luxury of doing a comprehensive edit on a first draft and a copy edit on a second draft. Our development cycles just move too fast these days, and so technical editors must learn to adapt and bring in the right amount of rules-based copy edits into your analysis-based comprehensive edits.

The Whole is Greater than the Sum of the Parts

Just as I tried to define and differentiate technical editing as a quality assurance task — are you tired of my soapbox yet? — I think that technical editors have been trying to differentiate themselves from grammar checkers or basic copy editors. That's why there has been a revolution with the levels of edits and all the types of edits truly evolving over time.

Comprehensive editing requires critical thinking and detailed analysis of the topic area and our users that copy editing just doesn't. Don't get me wrong — copy editing is critical to the delivery of high-quality content. But, if the content is not complete, logical, comprehensible, well-organized, or usable, then no amount of grammatically correct sentences will help the users get their work done. ■

MICHELLE CORBIN (michelle.l.corbin @gmail.com), STC Fellow, in her program Editing Matters, covers matters (topics) about editing that matter (are of consequence) to communicators of all kinds. Watch this space to understand more about editing and what you can do to improve the quality of your content.

REFERENCES

1. Van Buren, R. & Buehler, M.F. 1980. *The Levels of Edit* (2nd ed.). Arlington, VA: Society for Technical Communication. This document was scanned into a PDF and is available on the Internet Archive. Retrieved on 19 June 2021 from *https://archive.org/details /nasa_techdoc_19800011701*
2. Tarutz, J. 1992. *Technical Editing: The Practical Guide for Editors and Writers*. Reading, MA: Addison-Wesley Publishing Company.
3. Corbin, M. "Playing by the Rules." *Intercom*, 67 (3) (May/June 2020): 32.
4. "Levels of edit." Wikipedia. Retrieved on 19 June 2021 from *https:// en.wikipedia.org/wiki/Levels_of_edit*
5. Rude, C. D., and Eaton, A. 2011. *Technical Editing* (5th ed.). New York: Pearson Longman.
6. Corbin, Michelle, and Oestreich, L. 2011-2015. *Technical Editing Fundamentals* (STC Certificate Course). Arlington, VA: Society for Technical Communication.
7. Corbin, M. and L. Oestreich. 2011. "Editing: Reviewing Levels and Choosing Types." Presented at the 58th annual conference of the Society for Technical Communication, Technical Communication Summit, Sacramento, CA.
8. Norton, Scott. 2009. *Developmental Editing: A Handbook for Freelancers, Authors, and Publishers*. Chicago: The University of Chicago Press.
9. Weber, J. H. 2002. "Classifying Editorial Tasks." *Technical Editors' Eyrie*. Retrieved 19 June 2021, from https://jeanweber.com /newsite/?page_id=27.

Humanitarians Do Technical Communication, Too

BY GABRIEL LORENZO AGUILAR

For about three years, I've been studying how to improve the technical communication between humanitarian organizations and the recipients of aid. I'm investigating communication issues that these organizations often overlook — and who can blame them? Humanitarian organizations are often stretched thin while keeping the humanitarian goal in mind: giving aid to people in dire need. One such organization, Humane Borders (HB), needs to convey technical information effectively, and it has a special need to do so ethically. This column describes how I've redesigned a resource that Humane Borders publishes for migrants in need of water; at the end, I provide an open-ended heuristic that can help the field consider the ethics it takes to specify humanitarian aid.

Deriving Meaning from Data

HB is a large and highly organized operation that distributes water to migrants in the Arizona desert via 80 water stations. HB creates a lot of technical communication that not only helps volunteers and employees distribute water efficiently but to also help migrants find water. They frame their posters as a deterrence to avoid claims that they encourage migrants to cross the desert. These maps are printed and distributed across the border as a part of HB's humanitarian goal.

HB "Migrant Warning Posters" (MWP) show both the location of water stations and the locations of where migrants have died (Figure 1).

There are three key pieces of visual information here:

- Water stations (indicated by a blue flag)
- Locations where migrants died (red dots)
- Length of travel (arches labeled "Un Dia Caminando" or "One Day's Walk")

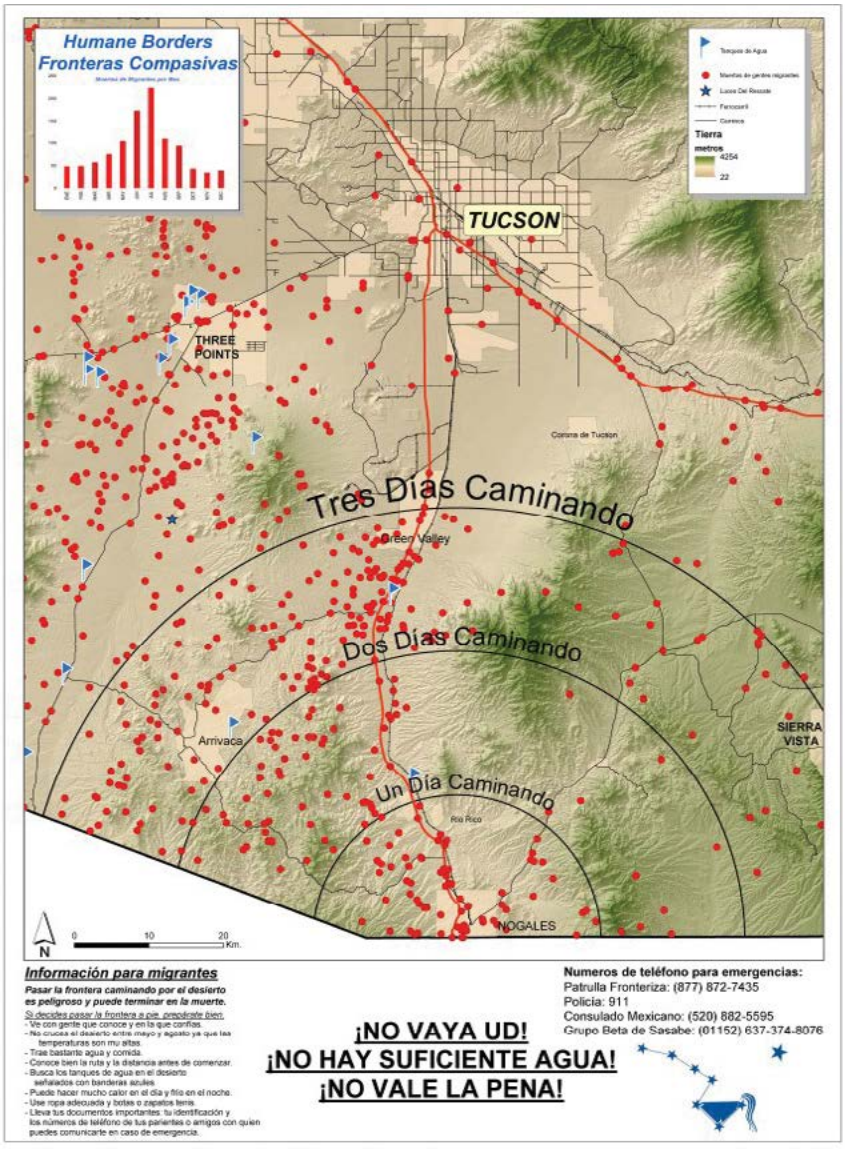
Humane Borders
Fronteras Compasivas
TUCSON
THREE POINTS
Tres Días Caminando
Green Valley
Dos Días Caminando
Arivaca
SIERRA VISTA
Un Día Caminando
NOGALES
Información para migrantes
Pasar la frontera caminando por el desierto es peligroso y puede terminar en la muerte.
Si decides pasar la frontera a pie, prepárate bien:
- Ve con gente que conoce y en la que confíes.
- No cruces el desierto entre mayo y agosto ya que las temperaturas son muy altas.
- Trae bastante agua y comida.
- Conoce bien la ruta y la distancia antes de comenzar.
- Busca los tanques de agua en el desierto señalados con banderas azules.
- Puede hacer mucho calor en el día y frío en el noche.
- Use ropa adecuada y botas o zapatos tenis.
- Lleva tus documentos importantes: tu identificación y los números de teléfono de tus parientes o amigos con quien puedes comunicarte en caso de emergencia.
¡NO VAYA UD!
¡NO HAY SUFICIENTE AGUA!
¡NO VALE LA PENA!
Numeros de teléfono para emergencias:
Patrulla Fronteriza: (877) 872-7435
Policía: 911
Consulado Mexicano: (520) 882-5595
Grupo Beta de Sasabe: (01152) 637-374-8076

Figure 1. HB's existing MWP

Migrants are also warned to "Not Make the Journey," and that there "Isn't enough Water," and "It's not worth the danger," along with life-saving advice to migrants in smaller print.

The original poster was overwhelming as the sea of red dots made it difficult to distinguish how different parts of the desert effected migrants differently. I found that these red dots hide so much of migrants' humanity: What are their names? What are their genders? What are their ages? What are the different ways migrants have been harmed? How can I/we help alleviate some of that harm? I used HB's archival database to investigate.
The "Map of Migrant Mortality" (Figures 2 and 3) is an open geographic information system (GIS) initiative between the state of Arizona and HB. It allows users to sort more than 3,000 deaths by name, gender, year of death, cause of death, county of discovery, land management, and land corridor. There are critical differences along the lines of sex, age, location, trajectory, and time, all of which can save lives. Yet on the map, the diversity of migrants gets reduced to a sea of red dots.

Further, as has been well noted by Sam Dragga and Dan Voss,[1,2] reducing people to rigid depictions of data — especially people of color[3] — can remove the humanity of those who have been harmed. In the case of the Migrant Warning Posters, the readers (often potential migrants) have limited opportunities to connect a red dot with personal characteristics. This limitation not only dehumanizes the deceased people in the poster but also can harm potential migrants.

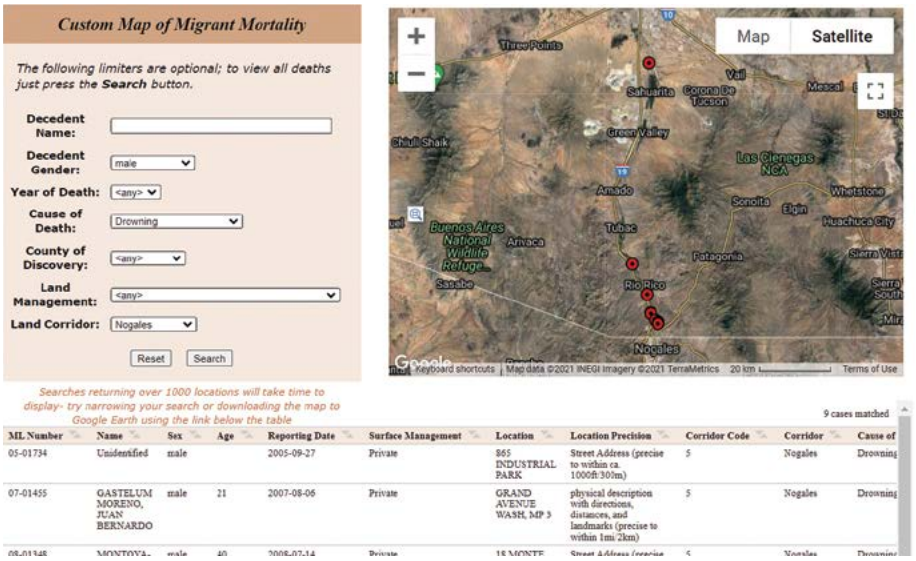

Figure 2. The interactive map of migrant mortality

Figure 3. Spreadsheet for the map of migrant mortality

Redesigning the Warning Poster for Those at Highest Risk

There are dozens of maps that could be redesigned from the data used in the Map of Migrant Mortality. However, there are significant differences in death rates from exposure for men and women. The disparity is evident across all land corridors in Arizona, with some places having 100% of migrant women deaths caused by exposure, compared to 23% of men. Nogales, the land corridor represented in the redesigned Migrant Warning Poster in Figure 4, shows 49% of women died of exposure compared to 37% of men.

The redesigned map demonstrates how one could improve technical communication by presenting the most relevant information. There are 26 women who have died by exposure in Nogales, according to the database. My goal is to both humanize these 26 women while making it clearer to future migrant women that they are under an increased risk

of dying by exposure. I used the time-distance markers (Un Dia Caminando, Dos Dias Caminando, etc.) from the original poster for reference. I opted to highlight three zones where the highest concentrations of women were found: *grupo amarillo* (yellow zone), *grupo morado* (purple zone), and *grupo rojo* (red zone) (Figures 4 and 5).

Organizing deceased migrant women in zones can better allow potential migrant women to see the most perilous parts of the desert while simultaneously humanizing the 26 deceased women. These color-coded zones make it clear that there are different risks associated with the trajectory of travel. For example, all deceased migrant women who have traveled eastward died of hyperthermia (*hipertermia*), while dehydration (*deshidración*) and heat stroke (*golpe de calor*) become factors when migrants travel westward. This information is valuable in the preparation migrants need when traveling.

The other benefit to the groups is the potential to humanize the women in the archive. I replaced the anonymous red dots with a numerical system where each woman is assigned a number that corresponds with a table on the backside of the redesigned poster that provides the name, age, cause of death, and year found. Not only are these 26 women humanized in this redesign, but potential migrants are also given valuable information on the age and cause of death of that person — information that can help migrants better prepare for travel.

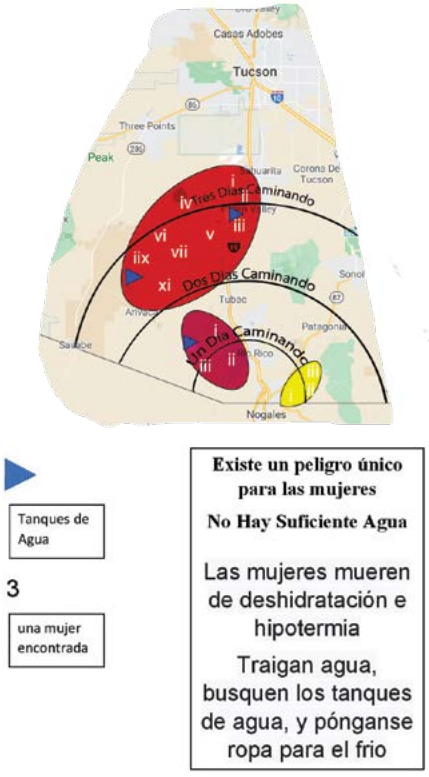

Figure 4. Front of redesigned MWP

Grupo Amarillo

Numero y Nombre	Edad	Causa De La Muerte	Año Encontrado
1. Tomasa	29	Hipertermia	2009
2. Juana	41	Hipertermia	2000
2. Erica	20	Hipertermia	2005
3. Silvia	23	Hipertermia	2006

Grupo Morado

Numero y Nombre	Edad	Causa De La Muerte	Año Econtrado
1. Araceli	33	Deshidración	2019
2. Josefina	40	Golpe de Calor	2003
2. Maria	31	Hipertermia	2008
3. Blanca	31	Hipertermia	2007
3. Sin Nombre	Sin Edad	Golpe de Calor	2002
3. Mayra	23	Deshidración	2008

Grupo Rojo

Numero y Nombre	Edad	Causa de la Muerte	Año Econtrado
1. Rosaura	34	Hipertermia	2008
2. Reyna	29	Golpe de Calor	2013
3. Mireya	22	Golpe de Calor	2013
4. Sin Nombre	Sin Edad	Hipertermia	2009
4. Blanca	22	Hipertermia	2007
4. Estela	21	Hipertermia	2005
5. Lucia	32	Hipertermia	2005
5. Azucena	39	Hipertermia	2007
5. Alicia	42	Hipertermia	2004
6. Blanca	34	Hipertermia	2004
6. Ingrid	19	Golde de Calor	2006
6. Carmen	22	Hipertermia	2004
7. Lydia	27	Golpe de Calor	2001
8. Ernestina	27	Hipertermia	2010
9. Josseline	14	Golpe de Calor	2008
9. Rosalinda	38	Hipertermia	2010

Figure 5. Back of redesigned MWP

A Heuristic for Moving Forward

Humanitarian technical communication needs our critical, and ethical, attention. My redesigned map reflected ethics based not only around questions asked by Dragga and Voss, but also other areas such as feminism,[4] social justice,[5] and critical race theory.[6,7] These areas of our field address issues that are relevant to humanitarian organizations, and it's important to engage with these issues in the hopes of bettering humanitarian aid.

I leave this column with a heuristic that I hope we can expand upon:

- **Is this providing the most relevant information for the audience?**
- **Does this data homogenize the people represented in it?**
- **What is not being said or represented in the data?**
- **How could a new or redesigned depiction of the data improve the communication to a target audience?**
- **How could one diversify a dataset?**
- **Where could one go to find more contexts on demographics?**
- **How could a specific group benefit from a new or redesigned depiction of data?**

By applying these criteria, we can present data that is both relevant and personal. ■

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REFERENCES

1. Dragga, S., & Voss, D. 2001. "Cruel Pies: The Inhumanity of Technical Illustrations." *Technical Communication*, 48 (3): 265–274.
2. "Hiding humanity: Verbal and Visual Ethics in Accident Reports." *Proceedings/STC, Society for Technical Communication Annual Conference*, 50 (1): 457–461.
3. Hartman, S. 2008. "Venus in Two Acts." *Small Axe: A Caribbean Journal of Criticism*, 26 (June): 1–14. *https://doi.org/10.2979/sax.2008.-.26.1*
4. Petersen, E. J., & Walton, R. 2018. "Bridging Analysis and Action: How Feminist Scholarship Can Inform the Social Justice Turn." *Journal of Business and Technical Communication*, 32 (4): 416–446. *https://doi.org/10.1177/1050651918780192*
5. Jones, N. N. 2016. "The Technical Communicator as Advocate: Integrating a Social Justice Approach in Technical Communication." *Journal of Technical Writing and Communication*, 46 (3): 342–361. *https://doi.org/10.1177/0047281616639472*
6. Agboka, G. Y. 2014. "Decolonial methodologies: Social justice perspectives in intercultural technical communication research." *Journal of Technical Writing and Communication*, 44 (3): 297–327. *https://doi.org/10.2190/TW.44.3.e*
7. Blake, A. M. 2011. "Audible Citizenship and Audiomobility: Race, Technology, and CB Radio." *American Quarterly*, 63 (3): 531–553. *https://doi.org/10.1353/aq.2011.0049*

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Making the Leap: Using Genre to Edit Effectively Between Rhetorical Communities

BY SEAN SCHEIBE

I was recently assigned a class project to edit a manual for a "Beavertail" hitch-pull trailer, named for the sloped extension on its rear trailer frame. As an editor of information technology (IT) documents, which concern software instructions, I was bewildered how to approach editing this type of mechanical content. I had no inkling at the time that this assignment would be a serendipitous event in my career development as an editor.

This subject matter involved mechanical — i.e., moving — components used for transporting various payloads on an interstate, as opposed to computers, whose data "payloads" are directed virtually over an information superhighway! However, after taking a metacognitive step back and pondering these documents through a lens of genre, I realized this deck of trailer manuals followed the same conventions and fulfilled the same purpose as IT documents do. I had stumbled upon the problem-solving power of genre.

Figure 1. A Beavertail hitch-pull trailer

Table 1. Linguistic Comparison – Software Deployment versus Mechanical Inspection List

Step No.	Software Installation Prerequisites
1.	Verify the account being used for installation has administrative privileges on the local and remote Database servers.

√	Step No.	Pre-Trip Inspection Checklist
	1.	Inspect the trailer for cracks in the structure or bent components such as the tongue or frame.

Genre Can Shorten the Learning Curve on a New Project

Regardless of the subject matter, I had found that, "genre provides a place to start, topically and structurally."[1] A genre is defined by its style, content, context, rhetorical purpose, and form, which is recognizable in reports, proposals, and in this case *manuals*. Recognizing that audiences have clear expectations for a genre's content and format provided me with a clear path forward. Understanding the grammatical, formatting, and formulaic conventions that define the "manual" genre would save me time in the appraisal of this document and focus my efforts at editing more effectively by recognizing what key elements define a manual's explanatory contents.

Hitch-pull trailer maintenance and operation presented me with a largely foreign subject matter; however, I realized the trailer manual content on a deeper level, as a genre, employed present tense, explanatory text in a nearly identical manner to IT documents, which use a present-tense imperative sentence construction. Procedures and checklists would be governed by the same conventions. The audiences of IT field service technicians and trailer vehicle mechanics/operators are different, but the rhetorical *purposes* of a deck of documents for them are the same — clear instructions to perform equipment maintenance. Facing an unknown subject and rhetorical context, I could still, "depend upon some of the conventions and expectations that the [manual] genre already provides."[1]

I became aware of this truism as the trailer company's lead engineer provided me with details on both the manual content and its intended audience and rhetorical focus. Using genre to appraise the mechanical subject matter of these trailer manuals was instrumental in creating an effective editing plan, which would enable me to adapt familiar conventions to the new subject matter. Audiences, terms, and the content all had different names, but were governed by the same conventions.

Sentence construction, table, and procedural formats shared by these rhetorical communities is exemplified in Table 1, which provides an example of the adaptation of IT table structures to the context of trailer vehicle maintenance. The Microsoft Style Guide suggests that writers dealing with this type of content use an imperative mood, which uses an active voice. Table 1 illustrates how the imperative mood works interchangeably between virtual and physical subjects.

Understanding the Limitations of Programmatic Editing

Academic awareness of the power of genre provided me with an effective tool to employ in my workplace and to understand the limitations of *programmatic* editing. Editing that is solely guided by the *program* — or house style guide, grammar, etc. — is an efficient way to edit. However, this approach overlooks fruitful areas of rhetorical awareness and development that an editor can cultivate outside the constraints of prescriptive rules. According to Mary Fran Buehler, "The best example of a programmatic approach in technical communication is the application of 'correct' grammar, spelling, and punctuation, without concern for all the varied elements of the [rhetorical] situation itself."[2] Instead of programmatic editing, a focus on genre and its related rhetorical situation(s), audience, and so forth allows an editor to collaborate in the creation

of knowledge as an authentic outgrowth of participation in a community and its linguistic traditions.

When I started as an editor for the Navy Marine Corps Intranet (NMCI), I learned that one of my primary roles was to ensure the uniformity of documents to our house style guide. This was an efficient way to view our roles as editors and was reflected in one of our team's goals, which is "to apply editing expertise that ensures documentation is produced in accordance with consistent and approved formats and document standards."

This is a solid foundation upon which to edit, but it omitted answers to questions such as, "Should we define a term based on how it is used colloquially in our rhetorical community, or use the term in our documents as it is defined in our glossary?" Based solely on our glossary, one particular term would be defined as Alternate Logon Token (ALT), which is a network access device. However, within the network support teams the term is spoken as "ALT token" — not *ALT* — or "Alternate Logon Token." Our editorial team has the discretion to treat the term in our IT documents as it's spoken, not as it's defined in our glossary. This is the difference between understanding a term as grammatically versus rhetorically correct and follows Carol Miller's axiom, "To write, to engage in any communication, is to participate in a community; to write well is to understand the conditions of one's own participation — the concepts, values, *traditions*, and *style* which permit identification with that [rhetorical] community..."[3] Our NMCI documentation accurately reflects that community's colloquial style and linguistic traditions.

Applying Tools to Make the Best Choices

Tempering the dictates of a house style guide with an awareness and understanding of genre is the difference between editing programmatically or editing by the rhetorical situation and genre. Using style guides and grammar as tools rather than as editorial manacles ensures the editor can ascertain the *best* choice for the rhetorical situation, not merely the correct choice.

Until this class assignment came along, I hadn't had the opportunity to use the editorial principles and skills I had learned to appraise documents with different types of subject matter. Using genre and rhetorical analysis to appraise trailer vehicle manuals provided me with the capability to bridge my understanding and skills to an entirely new subject matter — and at the same time gain confidence as an editor. ■

SEAN SCHEIBE (seanscheibe@u.boisestate.edu) worked for Peraton as a Technical Editor in support of the Navy Marine Corps Intranet (NMCI). Last year, he enrolled in the Boise State University technical communication program and hopes to complete his Certificate in Technical Communication in Spring 2022. One of his recent accomplishments was being added to the quality check (QC) rotation within a senior group of editors, where they edit each other's documents prior to finalization.

Editing Strategies to Consider

- **Use genre expectations to efficiently appraise and edit even the most unfamiliar documentation.**
- **Assess genre, purpose, audience, context — rhetorical situation — to uncover the audience expectations and conventions. This is instrumental in appraising the document as an editing plan is composed.**
- **Determine the expectations and needs of the reader to accurately match the genre of the document.**
- **Align conventions of the text — such as verb tense, usage, and prevailing sentence patterns — with audience needs.**
- **Anticipate and respond effectively to various rhetorical situations that might be different, but are unified by the social purpose and genre of the text.**

REFERENCES

1. Henze, Brent. 2013. "What Do Technical Communicators Need to Know about Genre?" In *Solving Problems in Technical Communication*, eds. Johndan Johnson-Eilola and Stuart A. Selber Chicago and London: The University of Chicago Press: 337-361
2. Buehler, Mary Fran. 2003. "Situational Editing: A Rhetorical Approach for the Technical Editor." *Technical Communication*, Vol. 50, No. 4 (November): 458-464
3. Miller, Carolyn R. 1979. "A Humanistic Rationale for Technical Writing." *College English*, Vol. 40, no. 6 (February): 610-617

2021-2022 President's Address

BY KIRSTY TAYLOR | STC President

For Kirsty's inaugural column, we are reprinting her address from the Annual Business Meeting, held in June 2021.

Firstly, I want to acknowledge the traditional owners of the country on which I'm living and joining you all from — the Jaggera and Turrbal peoples.

Thank you for allowing me to be the first Antipodean president of STC. Or, in other words, someone from the other end of the world. It is an honor and privilege to serve our professional association with you. I believe that STC is ours — our association doesn't only belong to the Board, or our staff, or our CEO — STC is also every interaction we have together as members and with future members, in communities, through social media, at conferences, in LinkedIn. STC is all over.

This year, where I will try to focus my efforts, and in turn, our efforts, will be categorized as the four C's:

- Consolidation
- Continuity (sometimes!)
- Change
- Community

Community is at the essence of STC. Our communities in chapters, in SIGs, in the professional and personal relationships we develop across the world with our STC peers, in the generous sharing of knowledge and our precious time for our fellow STC members. I hope we will find some new ways to form community with one another — through the STC Slack workspace or perhaps other mechanisms, as our countries hopefully make steps towards creating a safe, new social norm.

We will need your help to consolidate and, also, change. There have already been great efforts by chapters working together to consolidate and reduce volunteer effort by sharing various activities. I hope we see more of this collaboration and trying new ideas.

Continuity also needs to be balanced with change. We, as a professional association, need to continue to change, just like we all do in our professional and personal lives, because we aren't working, living, and networking in the same society that we were two years ago, 10 years ago, 20 years ago. We are halfway through 2021 — we're not in the era of *The Jetsons* or *Star Trek*, but nor are we in the 1990s.

The essentials of STC need to continue — our communities, our quality publications, variety of educational offerings, outstanding annual conference, our service to one another, and more. I hope you will continue to be understanding as we make changes to how some things have been — and also be patient as some change happens more slowly than we'd like.

I am asking a bit of you, I realize, and our members who haven't been able to join us today. I know you're up to the challenge.

If you want to be more involved in STC than you are today, or if you have ideas for where our shared future will be, please email me, or even better, the whole board at **board@stc.org**. There may not have been formal motions presented at this year's business meeting, but you can send your ideas to the Board at any time. The method of submission doesn't change the reception of the message.

I look forward to a great year of working with you for our profession and our society. And I hope to see lots of you in Rosemont (Chicago, IL) in May next year. ■

KIRSTY TAYLOR (ktaylor.stc@gmail.com) is the 2021-2022 president of STC. Her recurring column will provide updates and insights and solicit member feedback to guide ongoing decision-making.

My First Time Playing Dungeons and Dragons

BY JULIA SOUTHWICK | STC Member

An STC mentorship project with Bethany Aguad gave me this insight: Dungeons and Dragons is similar to technical communication. Fighting monsters as an Elven rogue might not seem to relate to work in Tech Comm, yet both challenges require thoughtful communication, working with a team, doing research, and applying critical thinking skills.

Dungeons and Dragons (D&D) is a fantasy role-playing game where each player creates a unique character that they will play. The game can focus on exploration, combat, role-playing, or some combination of the three. Each player creates a character sheet that defines the skills and abilities that the player's character has developed. This includes skills like stealth (sneakiness) or perception (observation) and abilities like casting spells. The Dungeon Master (DM) creates and runs the entire game world.

The narrative is a collaborative experience among all participants. When players want to take any action in the game that requires a challenge, they will roll a die to determine the outcome. Based on a combination of the number on the die, the character's skills, and the difficulty of the action, the DM will describe the outcome.

In my first session, we had mostly new players working with some veterans, so we reviewed how to use **Roll20.net**, a browser-based app for playing online. I played as Linea Faenane, the High Elf Wizard, and her feline familiar (magical companion), Lunara. Our DM, Bethany, provided the scenario, which is similar to a scope of work for a project.

Our characters worked for the Harpers, an organization that seeks to do good, working in the shadows of Waterdeep. Our contact assigned us a job: *An old bookseller, Uza, has trapped a monster in her shop and fears for her books and cat*. In exchange for efficient, speedy work, our characters would receive handsome compensation.

We went to the tavern to interview Uza. We listened carefully to her story and asked questions like: "Did you see the monster clearly?" and "Can you describe the interior of your shop for us, please?" Together, we sought an understanding of what we were facing, just as we would in a new technical communications project. Once we established all the necessary details, Uza took us to her store and waited safely outside while we went inside to both battle the monster and find her cat.

Once inside, Linea asked Lunara to look for Uza's cat. While exploring the shelves looking for clues, just like reviewing notes from subject matter experts (SME), the group noticed some scorch marks, books about monsters, and the monster itself.

We defeated the monster and Linea used a spell to identify how the monster arrived in the shop — through an enchanted book. We called Uza in, and Linea explained her findings. Uza thanked the group for their help.

As technical communicators, our skills make us the ideal party members, both in D&D and on the job. We shine in a collaborative environment where our communication, research abilities, and critical thinking skills can enhance the effectiveness of those around us. How about giving D&D a try? ■

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